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PROCEEDING

International Seminar
Learning, Community And Technology

JAKARTA, JUNE 8, 2011

FACULTY OF ENGINEERING, UNIVERSITAS NEGERI JAKARTA
in colaboration with INDONESIAN PROFESSIONAL ASSOCIATION OF EDUCATION TECHNOLOGY

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ISBN : 978-979-18306-3-8

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LEARNING IN THE COMMUNITY AND COMMUNITY LEARNING

The case of learning model for textile design courses at the Department of Fine Art – The State University of Jakarta

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Abstrak

Pembelajaran formal di perguruan tinggi, terutama pada mata kuliah praktika, seringkali sarat dengan teori namun kurang menyentuh pada permasalahan dan tantangan yang ada di masyarakat. Hal ini antara lain disebabkan oleh kondisi sarana dan prasarana di perguruan tinggi (PT) yang masih terbatas serta metode yang kurang sesuai dengan perkembangan ipteks serta permasalahan yang sesuai dengan kebutuhan masyarakat terkini. Faktor lain yang semakin memperparah keadaan adalah kualitas para dosen dan pimpinan jurusan yang kurang jitu dan kreatif dalam mengembangkan model dan pendekatan pembelajaran yang digunakan.

Belajar di masyarakat dengan model magang merupakan pilihan yang jitu dalam menjembatani kekurangan yang ada di perguruan tinggi dengan kondisi yang ada di masyarakat. Dengan rancangan yang tepat dan benar hal ini akan sangat membantu dalam memberikan dan meningkatkan berbagai kemampuan yang tidak mungkin diperoleh oleh mahasiswa dengan hanya belajar di kelas atau kampus. Bukan hanya keterampilan dan pengetahuan saja yang akan didapat oleh para mahasiswa dalam menghadapi permasalahan di dunia kerja, melainkan juga kemampuan soft skill meliputi motivasi kerja, kecerdasan sosial, kemampuan entrepreneur, kesadaran dan kecintaan terhadap pekerjaan yang dilakukan, kesadaran dan kepedulian dalam berbagi pada masyarakat di dunia kerja serta saling menghargai dapat terlatih melalui kerja magang atau belajar di masyarakat. Kondisi dan situasi ini dapat menambah kentalnya semangat kerja dan kreativitas mahasiswa dalam menghasilkan karya kreatif dan inovatif. Di lain pihak, dunia kerja pun akan mendapatkan keuntungan dengan adanya mahasiswa yang bekerja magang dimana mereka dapat memperoleh pemikiran berupa gagasan kreatif hasil eksplorasi dan eksperimentasi mahasiswa dalam berkreasi selama bekerja ditempat mereka. Adanya saling belajar dan membelajarkan seperti ini dalam waktu tertentu akan membangun saling percaya dan saling mengisi kekurangan dan memperkuat kekuatan bersama dalam menghasilkan gagasan dan produk kreatif. Suasana kerja yang kondusif ini bila dilakukan secara berkelanjutan dapat menjadi cikal bakal terbentuknya suatu masyarakat belajar antara kampus dan pihak dunia kerja serta masyarakat setempat.

Pendidikan abad 21 menuntut peralihan dari fokus pembelajaran pada individual ke fokus pembelajaran sebagai bagian dari masyarakat. Masyarakat belajar dan bekerja yang telah berjalan ini perlu lebih dioptimalkan melalui rencana yang jitu dan kreatif. Pihak kampus perlu menjadikan masyarakat belajar sebagai wadah inkubator kerja produktif dan binaan universitas. Berbagai program kerja dapat dibangun bersama dengan melibatkan unsur masyarakat setempat, dunia kerja, mahasiswa, dosen dan pihak pendukung dana. Makalah ini akan mengangkat kasus dari model pembelajaran

yang diterapkan pada mata kuliah disain tekstil di jurusan Seni rupa UNJ hingga terbangunnya masyarakat belajar dan bekerja di daerah Palmerah Jakarta Barat.

Kata Kunci :*Belajar di masyarakat, model magang, masyarakat belajar dan bekerja, inkubator dan daerah binaan*

Introduction

Textile Designis one of the obligatory practice subjects for students of the Department of Fine Arts, Jakarta State University. This subject is categorized as one of the design subjects, weighing 2 credits. Students can take this subject in semester 5 after they passed the Basic Design -2 and 3 dimensions, and decorative variations. Like it is stated in the Department of Fine Arts curricula of 2011, the competency standards to be achieved under the Textile Design subject include: competency to represent the knowledge and both appreciative and crative behaviors towards the production of textile design that applies different decorative variations of the Indonesian archipelago *(ragam hias nusantara)* into functional clothing, using printing, batik, and hand-woven techniques. In this subject, students learn various knowledges relevant to the designing concept, principles, and procedures of textile as a functional substance and how to produce it using various techniques, such as simple printing, batik, and hand-weaving.

Expected competencies for students to obtain from this textile design subject play important role in their teaching assignment at school, because the textile subject is included in the curricula of each of the education levels. Besides to be applied at school, this competency could also be used as an asset for the students, should they be starting their own creative business, or working in the society. Even during their studying period, a lot of students already have orders for or started their own kiosks selling some of the textile products (T-shirt or bag-printing, etc.) inside and outside campus.

Textile Design subject has been included in the Department of Fine Arts curricula for more than 25 years. Various learning models have been applied for students to obtain optimum learning results, according to the basic competencies (TIU-TIK before KTSP) stated in the Department of Fine Arts curricula. Initially, the learning model being applied was the conventional model, where students learn the whole materials of the subject (theory and practice) in the classroom, being provided by a single lecturer as responsibility-taker. In general, students had not reached optimum creativity in producing their work, and were lacking the motivation to learn and work. Additionally, the minimum availability of supporting facilities and infrastructure in the department further degraded their learning and producing motivation. This caused the lacking of creativity in the textiles that they produced.

Based on the on-going analyses, the root of the problem of students' incapability in creating creative design products are caused by minimum supporting facilities and infrastructures provided in the Department of Fine Arts. The fact that students have not optimally explored various materials and techniques in textile producing (batik, printing, and hand-weaving) caused in their incapability to produce creative works. Efforts have been pulled out to renew the required equipments and infrastructures for

the textile design subject, but only with minimum results. Based on these various challenges, in 2004 a team of lecturers started to apply a new learning method by using elements in the industrial community as additional resources, aside from existing lecturers.

Learning in the industrial community

Currently, learning in the industrial community is something common to be done, and this model is known as the internship model. Most of the internships conducted by both the industry and the universities depend on the pre-determined role and purpose. The conceptual basis of learning in the community is a learning being planned, managed, focused, and conducted outside of the classroom, and with flexible learning hours (Smith, Mark K., 2001).

With regard to the learning model for Textile Design subject, it is basically a combination between learning in the industrial community, which is known as the internship, with classroom or campus lectures (the lecture-internship model). The purpose of this model is as follows: 1) Increase knowledge on textile (concept, principles, and procedures); 2) Develop students' creativity in designing for them to produce textile design works; 3) Recognize the production process directly and concretely; 4) Increase the skill in designing and producing textile through various tecniques; 5) Obtain real-time work experience; 6) Proliferate students' motivation to learn, work, and produce textile; 7) Identify and directly conduct various techniques of the producing process; 8) Identify and complement students' entrepreneurship knowledge; and, 9) Increase students' skills in cooperating with the industrial community. Through this model, an exchange of knowledge is expected to happen between the academics (lecturers and students) with the industrial community (craftsmen and company-owners).

Selection of the particular industrial community as the internship site of this model is based on the following criteria: relebant with the subject's material, categorized as small-medium enterprise (SME), managed simply but professionally, medium-level of production, owning sufficient facilities and infrastructures according to the latest advancement of technology, and having a cooperative-agreement with the department. In the context of Textile Design subject, internship site being prepared include printing and the tie-dye, batik industry. Regarding the internship site, the Department of Fine Arts selected 'Bong Gallery' enterprise located in Palmerah, West Jakarta (in the context of batik and tie-dye), and a pattern printing enterprise 'Image Printing', located in Kebon Nanas, East Jakarta (in the context of material printing). Bong Gallery enterprise produces textiles with batik and tie-dye techniques. Most of this enterprise's customers are well-known designers that entrusted their design to be produced by this enterprise. It is being selected as one of the internship site because it has developed good cooperation with the Department of Fine Arts through various community service activities. The other counterpart, 'Image Printing' enterprise, produces various functional materials using the printing or pattern printing techniques (to produce bags, T-shirts, etc.). Customers of this enterprise are mostly from the mid-

level society, and it mostly meets orders of mass production for seminars, campaigns, clothing materials, etc.

This cooperation is mutual: besides benefiting the Department of Fine Arts, it is also beneficial to the partner enterprise, as follows: 1) obtaining more orders; 2) opportunity to exchange creative ideas with both lecturers and students; 3) Increase craftmens' work motivation; 4) gaining trust as counterpart (from the department and university); 5) Strengthen the cooperation with both the department and university.

The overall learning materials and strategy for both in the campus and at the internship site are formulated in the lesson plan. The lesson plan at the internship site is formulated together with the industrial community. The overall syllabi and SAP of this subject are then disseminated and discussed with the industrial community, for them to understand the whole learning process of the Textile Design subject. There are 16 meetings in total, with 8 meetings for learning in the campus vicinity, 6 meetings with the industrial community, and 2 meetings for examination. Learning delivery still refers to the pre-determined SAP, whereas the timing/ scheduling is flexible, depending on each student's ability.

Before working at the internship site, students are assigned to create batik and printing design, which already been consulted with and approved by their lecturers. Basically, during their time at the internship site, students will conduct two main things: technique exploration and producing, in accordance with whatever procedure is in effect at the internship site. Students work in groups, but the assignments they do are individual, and the whole process and work results are then built in a portfolio based on what are assigned by their respective lecturer. During the internship, the learning process is managed by the enterprise, while lecturers only accompany their presence in the site. In campus, learning are delivered using an active approach, where the learning orientation is towards the student, while learning and working atmosphere are set-up for groups, while the main tasks are to be conducted individually.

TOTAL MEETINGS	MATERIALS	LEARNING LOCATION	
		CAMPUS	INDUSTRY
8 times	Knowledge on textile design (concept, principles, and procedures)	V	
	Knowledge and Skills to do needs survey and analysis		
	Basic concept and development of creative ideas		
	Basic skills to produce textile using printing, batik, and hand-weaving techniques		
	Production and marketing management		
6 times	Production techniques		V

	Production and marketing management		
	Entrepreneurship knowledge		
2 times	Mid-Term Examination	V	
	Textile Design subject Exhibition		
	Final Examination of the semester		

Table 1. Material Structure for Textile Design Subject – Department of Fine Arts, UNJ

The assessment used for this subject uses the authentic assessment: student reflection, self-assessment, and portfolio. The lecturer gives scores for each student's portfolio and exhibition of work, while the industrial community gives scores for the product being worked on during the internship. By end of the subject period, students will hold an exhibition, of which management and materials are conducted by the students, independently. The ability to hold this exhibition is one of the several aspects being scored for the students' success on this subject.

After being applied in the Department of Fine Arts for ten years, based on an evaluation and analysis conducted on it, there are several **strengths, weaknesses, opportunities, and threats** related to the implementation of this model. Strengths include: 1) Giving multiple benefits for the students, lecturers, and department; 2) Increasing motivations of the students in learning and working; 3) Increasing motivation of the lecturers in working; 4) Increasing knowledge on the most updated production techniques; 5) Increasing creativity of the students in creating ideas; 6) Increasing capacity, in understanding market preferences and consumers' needs; 7) Increasing understanding of materials, tecniques, and equipments; 8) Increasing collaborating capacity of the craftsmen, entrepreneur, and the industrial community; 9) Increasing entrepreneurship and working independence capacities in the students; 10) Increasing the awareness and concern on the work being done; and, 11) Increasing capacity to share and exchange knowledge with the industrial community and their surrounding communities. Weaknesses faced in the context of implementation of this lecture-internship model include: 1) students will have to spend extra funding for the internship, particularly with regard to the quite distant location from campus; 2) various levels of students' independence, interest, and motivation affect the length of the internship; and, 3) motivation of the industrial community as counterpart. All the while, the following are opportunities: 1) Development of a collaborative program between both parties; 2) Opening new work opportunities for students with very good achievement, from their internship site or customers; 3) Its development into an incubator of the Department of Fine Arts; and, 4) Extension of the network, by establishing a batik community around the industrial site, involving relevant students and lecaturers. The following are the threats that need to be tackled: 1) how to maintain and improve the cooperation between the department with the industrial community (role of the Head of Department and pertinent lecturers); 2) evaluation of the activity routinely every semester; 3) how to develop alternatives of the internship model; 4) how to extend cooperation with the

industrial community; and, 5) how to spread the application of the internship model to various practice subjects in the Department of Fine Arts.

Towards the learning and creating community

In the 21st century, education undergoes a shift of focus from an individual learning into learning as part of the society. According to Feldman (2000) in the beginning of the 21st century, this shift from the individual era to the society era has occured. In the education world, this shift is manifested into a learning community, which is aimed at a balance between indicidually-focused education into that focused on contribution for the society through social networks, such as relation, participation, feedback, membership, and collaboration.

There is wide variations of explicit definition on the learning community, due to its high flexibility (Feldman, 2000). There are two main things in the utilization of the learning community, i.e.: 1) It is focusing on the community element, is a synergy of various individuals at public places or of common interest, working together to share understaning, skills, and knowledge, in order to achieve common purpose; and, 2) It is focusing on the curricular structure as a facility that allows more in-depth development of the pre-determined curricula contents (Kezar, 1999).

A learning community meets the needs of the society through partnership. It is using the power of social change and institutions in the cultural perseption of a learning value. Learning community has explicitly used learning as a tool to promote social cohesion, regeneration, and economic development, by involving all elements of the society. One of the benefits gained from this learning community is an increase in the society's capacity to form and manage its future in the form of collaborative empowerment (Himmelmann, 1994).

The basic concept of Learning Community has underwent changing understanding from time to time, depending on the particular purpose, role, and location (Jensen, 1964). There are several pertinent keywords, including: common purpose, learning design, delivered outside of the classroom, flexible learning hours, and a procedure agreed by both parties.

After more than 16 years implementation of this lecture-internship program of the textile design subject, the collaboration between the university and industry has become more in-depth, not limited to the implementation of the internship and lecture program of the Textile Design subject only, but have also developed into an internship program for 'Final Assignment' students that are focusing on textile (printing, batik, and hand-woven textiles), into the production site of various students' works that are related to textile (printing, batik, tie-dye, University of Jakarta's batik communities, exhibition, etc.). This has shown that collaboration has grown more in-depth between the two parties, to allow a well-manifested work synergy. This is very positive as an initial form of a learning and working community between university and the industrial community. This embryo of a learning and working community needs to be optimized through an accurate and creative plan.

Building an incubator

The development of this learning community embryo can be pursued through development of an incubator. This effort needs to be well-planned, including a three-stage plan: Incubator Planning, Trying-out stage, and Incubator Strengthening stage. In the incubator planning stage, an appropriate model is being identified based on the relevant condition, situation, and common purpose. It is deemed more appropriate to utilize the external model, where the craftsmen still work at the industrial location, while the accompaniment (lecturer, students) visit the industrial location. Along with it, the curricula, materials for accompaniment and development, and implementation strategy are formulated based on a common purpose. The economic benefit element needs to be taken into consideration as one of the common purposes, functioning as the program's sustainability assurance. Operation of this external incubator model is under the University's Community Service Institution. This is one of the alternatives of consulting to the industrial community. The Incubator Information Network System *(Sistem Jaringan Informasi Inkubator – SJII)* is required to operate this model. The Try-out stage is the stage where craftsmen and students implement the whole curricula, training and assistance materials, without having to leave the industrial site. The university, in this case the lecturers and experts will visit the try-out site and conduct assistance and development on the training materials being tried-out. The last stage is the incubator strengthening stage, where the learning process is strengthened by an integrated system of various aspects. Extension towards a learning and working community that is more inclusive and sustainable, can involve a wider public through the formal education (the school) located in the surroundings of the industrial site.

Closure

Learning in an industrial community with the appropriate model and strategy can become an embryo of a learning community. Education that is focused on individual has started to change into one that becomes part of the society. Competency of the graduates through the lecture-internship model can increase their capacity in learning and working collaboratively in the development of each of the individual. The learning community can be built based on a collaborative agreement of both parties and to synergize in an effort to achieve success. Development of the learning community into the department's incubator utilizing an external model can be conducted through several stages: Incubator Planning, Try-out Stage, and Incubator Strengthening Stage.

The whole effort, since the establishment of the learning community to the formulation of a batik incubator in the Department of Fine Arts have just reached the planning stage, of which implementation is still waiting for funding from donors. The effort to manifest this whole plan requires time and determination from both parties (the department and industrial community).

Started off from a simple integrated learning model of lecture-internship, one can be developed into an incubator model, which will generate economic, social, and cultural benefits for both parties (university and industrial counterpart). Limitations, in terms of facilities and infrastructures at the Department of Fine Arts could be tackled by

applying an integrated model of lecture-internship. Additionally, besides increasing the quality of the students' work under the Textile Design subject, it can also establish the embryo of a learning community for 'batik' in Palmerah, West Jakarta.

It requires a policy from the head of the department in disseminating the information about and applying the development of the lecture-internship learning model in all the practice subjects in the Department of Fine Arts. With the fluorishing collaborations with the industrial community, a bigger opportunity will develop for students to obtain direct experience in learning and working in the actual world of employment. Moreover, the Department of Fine Arts will also be able to establish a learning community in the form of incubator, which can give a variety of benefits economically, socially, and culturally.

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THE ROLES AND COMPETENCIES OF THE HUMAN PERFORMANCE TECHNOLOGY PRACTITIONER IN LEARNING ORGANIZATION

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Abstract

This article introduces the concepts of human performance technology (HPT), that is a systematic process of discovering and analyzing important human performance gaps, planning for future improvement, designing and developing cost effective and ethically justifiable interventions to close improvement gaps, implementing the interventions, and evaluating the financial and nonfinancial result. One of the most contribution of the model for HPT was the identification of the roles, competencies and output associated with HPT work. Competencies are internal capabilities that people bring to their job. Four roles are directly linked to the six steps of the HPT process model, these include the four roles of the analyst, intervention specialist, change manager, and evaluator. Each role has six role competencies associated with it. One way in which competencies can be broadly classified in technical and non technical. Technical competencies are specific to certain roles, such as the role of the analyst; evaluator etc.. Nontechnical competencies, on the other hand, are competencies that are more generic in nature and apply across the complete terrain of HPT, and sometimes called core competencies, that is industry awareness; leadership skills; interpersonal relationship skills; technological awareness and understanding; problem solving skills; system thinking and understanding; performance understanding; knowledge of interventions; business understanding; organization understanding; negotiating/contracting skills; buy-in/advocacy skills; coping skills; ability to see "Big picture"; consulting skills; and project management skills. Finally, a number of output are produced throught the enhancement of the competencies

Keywords: HPT Practitioners, role, and competency.

The knowledge society is characterized by privatization, globalization and information and communication technology (ICT). As a consequence large amounts of

information, international cooperation and networks have become part of the work environment. To survive and compete in the knowledge society, organization must learn to manage their intellectual assets. Many knowledge intensive organization achieved spectacular succes in recent years ((Probst, 2003). A digital work environment can be seen as a work environment where ICT is regularly used. In such an environment, but especially where the Internet and mobile technologies are commonplace, information security risks are increased considerably. Furthermore, continuing changes in learning organizations need to be managed effectively. Dealing effectively with information and communication using the technology, have become important issues in organizations, but at the same time this has proven to be very complex and managers often struggle to define their role in the new working situation.

It has become clear that organizations have to deal with a different way of working and employees have to deal with a changed work environment. Labour and labour relations in the knowledge society have changed considerably since the introduction of the Internet and globalization. One example is that the working relationship of employees has shifted from secure employment and permanent loyalty in a transactional relationship between the employer and employee in the industrial society to reduced job security and no permanent loyalty between the employer and employee in the knowledge society. The emphasis is currently on flexibility in the organization regarding employment, as well as on employability of the employee who is in control of his/her own career. At the same time commitment is expected during the time of contract. Mobility is essential. Work is not necessarily dependent on location and time. Effective communication is an essential competency and in the context of the information society, this includes knowing how and when to use the tools of communication. Work has increased in complexity and tasks have been broadened. Innovation and creativity are essential in order to continue participating in the rapidly changing work environment. It is therefore necessary to continue to learn beyond initial training and employment. An attitude of lifelong learning and flexibility has become essential, but learning how to learn is vital. It thus appears to be very important for organizations to become learning organizations in order to work effectively within the information society. Furthermore, Competency management, ICTsecurity awareness management, as well as Innovation and Change management, Participating in Knowledge Management, Participating in Community Practice, Participating in Learning Organization, Having Operational Knowledge in ICT, Finding and Evaluating Quality Information When Needed, Attitudes toward Learning about ICT and Using Internet Effectively have become important strategies for learning organizations to survive. In addition, in order to deal with the changed ways of working it has become paramount to know how to learn. For the purpose of this article competencies are defined as a combination of knowledge and insight, skills and behavior as well as attitudes (Song, 2010).

A. Changed Role in The Knowledge Society

An alternative ways of working through ICT-technology require employees in general to develop new competencies. This is especially true for managers who play such an important role in organizations. They are responsible for the management of knowledge in their own unit. Furthermore, they could influence their subordinates to participate in the learning organization and the new ways of working using ICT. Hence it appears important to revisit information, communication and technological competencies required by managers in order to ensure that managers are fully prepared to work effectively in the information society. We describe that ICT competencies was classified between ICT competencies and ICT related competencies. ICT competencies as competencies related to managers using software, hardware and networks like the Internet in their work environment, whilst ICT related competencies are defined as competencies which are related to the changed ways of working in the information society from a manager's perspective and thus contain a leadership component. Separate analysis aimed at finding the information, communication and technological competencies was conducted for each of the two mentioned groups of competencies. However, for the purpose of this paper the two types of competencies are grouped together in one scale called 'Information Society competencies for managers', since both kind of competencies are in essence related to working with information and communication technology in the information society.

B. Understanding The Business Is Important

When we talk about business , it certainly includes the corporate sector , wchich is the normal concept we think of when we mention the word business. But a business is really organization that offers a product or service to the customers. Therefore business includes profit or non profit oragnization, educational systems or institutions, financial institutions, hospital, social service agencies, and so on. Human Performance Technology (HPT) is the study and ethical practice of improving poductivity in organization by designing and developing effective interventions that are results-oriented, comprehensive and systemic (Pershing, 2006). HPT is a systematic process of discovering and analyzing important human performance gaps, planning for future improvement in human performance, designing and developing cost effective and ethically justifiable interventions to close improvement gaps, implementing the interventions, and evaluating the financial and nonfinancial result (Rothwell, 2000, 2007). When HPT practitioners present ideas and recommendations to clients, the clients must balance those ideas with many others they face in doing business in their organization. If HPT practitioners cannot understand these business concepts and the business language their clients use, how can they understand their client's most preSsing problem? And if HPT practitioners make recommendations that do not take into accountall the business issues the client face, why the client trust the recommendations? They expect to recommend actions that will not shipwreck other key business initiatives in their areas of responsibility, and they expect to find out about these issues and take them into considerations. They expect to be able to state both the

cost and the payoff of proposal we are making in business terms so they can evaluate it and make an informed decision so they can defend action if challenge.

So how HPT practitioners can improve human performance? We can use the Business Logic Model to frame and organize this assignment. The model can be used to accomplish two things : Understand a client organization and begin developing a scorecard for the oragnization. The business logic matrix looks at business as something that can be viewed from different logical perspectives. Each logic focuses on different aspects of organization. Models describes the seven logics of an organization: (1) External logic: opportunities and threats the organization faces on economis, demographic, poliitical and legal, technological and soociocultural etc. ; (2) Economic logic: how the organization makes a profit and achieves growth; (3) Strategy logic: the purpose of the organization, the direction it is moving in and its plans for getting there, and the organization culture; (4) Customer logic: how the organization attracts and reatains customers; (5) Product logic: how the organization's product and service appealtocustomers, and how the organization differentiates it selp from others, similar organization; (6) Process logic: how the organization create, produces, and deliverss it s product and services; and (7) internal logic: the organization's infrastructure , that is how it organizes itself to accomplishits work. .

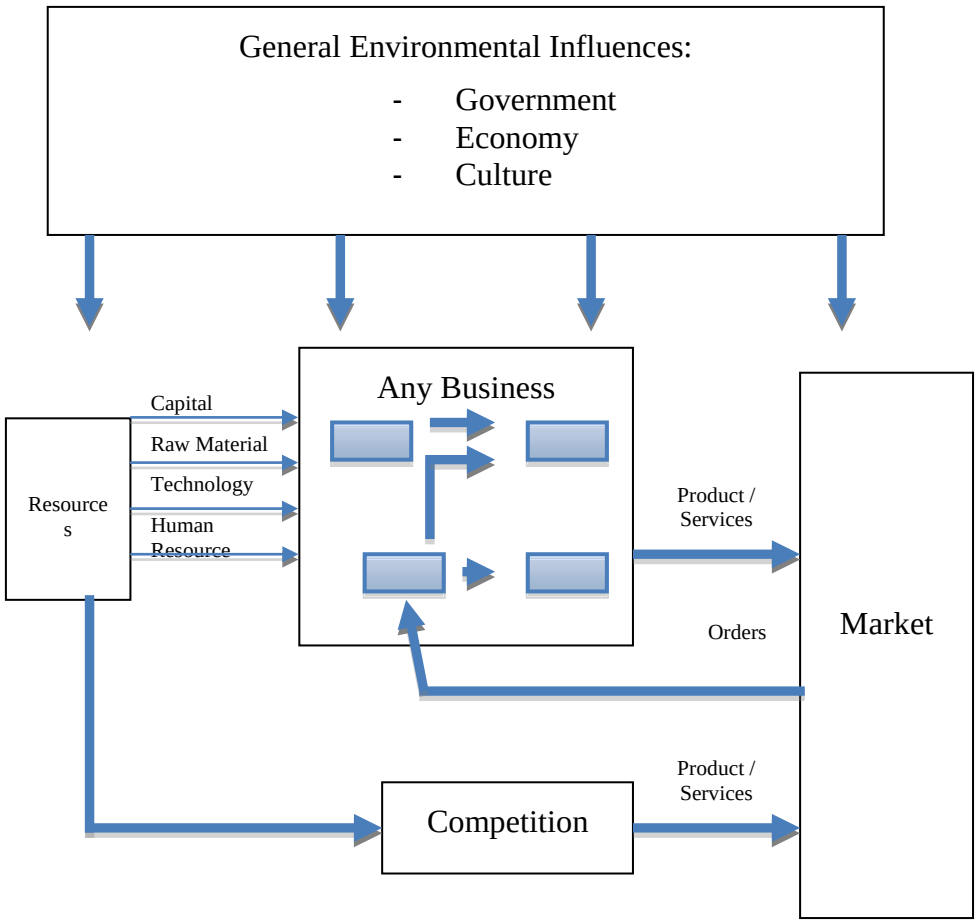

Figure 1: Learning Organization As Adaptive System

Table 1: Business Logic Matrix

Business Logic	Measures	Target	Current	Gap	Performance Problem	Interventions	Evaluated and Measured Result
External							
Economic							
Strategy							
Customer							
Product							
Process							
Internal							

C. **The Performance Improvement Process Model**

Performance improvement (PI) is a field of practice that has produced many models. A model is, "a simplified representation of an object, process, or phenomenon". ASTD *Models of Human Performance Improvement* includes a six-step PI process model, which was derived from many sources and confirmed through an expert-based research study. This PI process model contains the primary components that are found in most comprehensive performances improvement frameworks. This process model has six steps, which include "performances analysis, cause analysis, intervention, implementation, change management, and evaluation".

In explaining the first step, performances analysis, people who do human performances improvement work identify and describe past, present, and future human performance gaps." The second step, cause analysis, involves determining the root cause or causes of the gaps identified in the first step. The third step---selection of appropriate interventions---"people who do human performance work consider possible ways to close past, present, or possible future performance gaps by addressing their root cause(s)." In the fourth step, implementation, "people who do human performance improvement work help the organization prepare to install an intervention." In the fifth step, change management, they monitor the design, development and implementation of the intervention. Finally, in the sixth step, evaluation and measurement, they "take stock of the results achieved by he intervention."

D. The Roles of the HPT Practitioner

Four roles directly linked to the six steps of the performance improvement process model described in ASTD *Models for Human Improvement*. A role is defined as "a part

played by a person involved in performances improvement work. Specifially, these include the four roles of the analyst, intervention specialist, change manager, and evaluator. Figure 2 shows the relationship between the roles and each of the steps in the PI process.

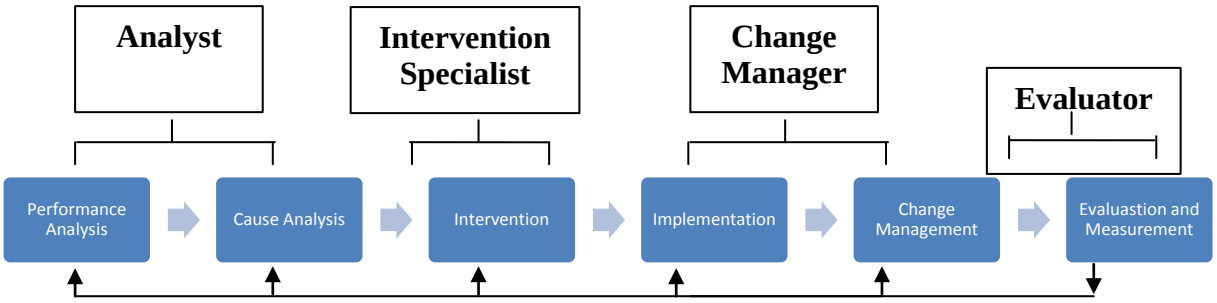

Figure 2: Relationship between Performance Improvement Process Model and Roles

Several roles are aligned to multiple steps in the process model. The Anlyst, for example, is associated with the two process steps of performance analysis and cause analysis.The role of the performance improvement analyst, considered by many to be the most important, involves performances analysis and cause analysis. The analyst "conducts troubleshooting to isolate the cause(s) of the performance gaps or identifies areas in which human performances can be improved. These process of the analysis help the PI prior to recommending and implementing the apporopriate solution system. Many performance improvement interventions or strategies can be selected by the HPT practioner and may involve instruction, as well as non instruction solutions. Appropriate intervention selection is the responsibility of the role of the intervention specialist. The person in this role "selects appropriate interventions to address the root cause(s) of performance gaps." The selection of intervention is a natural extension of the analysis work that was conducted in the previous steps. Implementation of the intervention that was chosen involves engaging in short- and long-term change management. For this reason, the third role is that of the change manager. The change manager "ensures that interventions are implemented in ways consistent with desired result and that they help individuals and groups achieve results", The evaluator role is the fourth and final role of the HPT practitioner. Evaluation and measurement, the focus are important to performances improvement efforts to ensure that the intended results of the interventions were achieved. The focus of evaluation is on the original performances problem or opportunity identified in the analysis phase. In other words, tha stage for evaluation is set during the analysis. The evaluator "assesses the impact of the interventions and follows up on changes made, actions taken, and result achieved in order top provide participants and stakeholders with information about how well intervention are being implemented" .

It is not necessary for one person to become an expert in all four roles, but a certain degree of competence is expected, especially if a single person is functioning in all roles. In cases where one person serves in multiple roles during performance improvement efforts, thought, the roles may blur together. Further, when a team or group of people engage in PI, the process is much more fluid and dynamic than the step by step-by-step process model may imply. When you examine PI Model, you might assume that PI work progresses in linear fashion from performance analysis to cause analysis, and the from cause analysis to intervention selection. Similarly, this sequential model makes it seem as if the HPT practitioner starts in the role of analyst and only later adopts the roles of the interventions specialist, change manager, and evaluator. This assumption of a linear, sequential flow is simply not accurate or realistic. During an PI project, the HPT practitioner may assume each role simultaneously. For example, during implementation, the results of the analysis (the role of analyst) are taken into account to ensure that progress toward solving the underlying cause of the performance problem is being made. The reasons for the intervention and the criteria by which it was selected (the role of intervention specialist) should be weighed as well, to convey to key stakeholders what is happening and why this approach is being taken, Finally, during implementation, HPT practitioners should continually monitor progress and make midcourse correction as necessary (the role of evaluator). Another example is the role of change manager. Many of the competencies with change management can, and should, be demonstrated throughout the PI process as a way to build buy-in and commitment to the performance improvement effort.

One of the most contribution of the PI model was the identification of the roles, competencies and output associated with HPT Practitioners work. Competencies are internal capabilities that people bring to their job. Each role has six role competencies associated with it. One way in which competencies can be broadly classified in technical and non technical. **Technical competencies** are specific to certain roles, such as the role of the analyst; evaluator etc.. **Nontechnical competencies**, on the other hand, are competencies that are more generic in nature and apply across the complete terrain of HPT, and sometimes called **Core competencies,** that is industry awareness; leadership skills; interpersonal relationship skills; technological awareness and understanding; problem solving skills; system thinking and understanding; performance understanding; knowledge of interventions; business understanding; organization understanding; negotiating/contracting skills; buy-in/advocacy skills; coping skills; ability to see “Big picture”; consulting skills; and project management skills.

Tabel 2: Relationship Between Competencies and Outputs

A. Non Technical Competency	**Outputs**
Industry Awareness : Understanding the vision, strategy, goals and culture of an industry or organization; linking human performance	▪ Description of industry/ organizational status.

improvement interventions to organizational goals.	
Leadership Skills : Knowing how to lead or influence others positively to achieve desired work results.	▪ Positive influence on others exhibited .
Interpersonal Relationship Skills : Working effectively with other to achieve common goals, exercising effective interpersonal influence	▪ Positive relationship established and maintained with clients, stakeholders, and decision makers.
Technological Awareness and Understanding : Using existing or new technology, different types of software and hardware and understanding performance support systems and applying them as appropriate	▪ Facility in using technology
Problem-Solving Skills : Detecting performance gaps and helping other people discover ways to close performance gaps in the present and future; closing performance gaps between accrual and ideal performance	▪ Strategies for groups, teams, or individuals to discover present or anticipated performance gaps ▪ Applicant of quality tools to identify special and general causes (histograms, trend charts, etc). written and oral briefings to performers, performers' mangers, process owners and other stakeholders about performance gaps. ▪ Problem-solving activities to lead performers, performers' manager, process owners and other stakeholders to discover/forecast the likely impact of multiple interventions on processes, individuals, or the organization.
System Thinking and Understanding : Indentifying inputs, throughputs, and outputs of a subsystem, system or suprasystem and applying that information to improve human performance; realizing the implications of interventions on many parts of an organization, process or individual; taking steps to address side effects of human performance improvement interventions.	▪ Systems flowcharts showing the impact of interventions on processes, individuals, or the organization.
Performance Understanding : Distinguishing	▪ Written and oral description of

between activities and results; recognizing consequences.	performance ▪ Visual charts or other aids to show performance
Knowledge of Interventions : Demonstrating an understanding of the many ways that human performance can be improved in organizational settings; showing an understanding how to apply specific human performance improvement interventions to close existing or anticipated performance gaps.	▪ Employee recruitment programs ▪ Employee orientation programs ▪ Employee training programs using systematic approaches ▪ Establishing learning organizations ▪ Employee performance appraisal practices and programs ▪ Career development programs ▪ Organization development interventions ▪ Compensation, reward, and incentive programs. ▪ Employee feedback programs ▪ Employee discipline programs ▪ Employee counseling and wellness programs ▪ Safety programs ▪ Improved tools and equipment ▪ Improved on-the-job training ▪ Improved on-the-job learning ▪ Job aids ▪ Organizational design ▪ Job design ▪ Task Design ▪ Ergonomic improvements ▪ Improved employee staff planning and forecasting programs ▪ Other human performance improvement strategies/interventions.
Business Understanding : Demonstrating awareness of the inner working of business functions and how business decisions affect financial or nonfinancial work result (McLagan, 1989).	▪ Flowcharts of work processes ▪ Flowcharts of organizational operations/networks ▪ Flowcharts of interactions with customers and other stakeholders ▪ Cash flow statement ▪ Budget documents ▪ Income sheets and balance statements

Organization Understanding : Seeing organizations as dynamic, political, economic and social systems which have multiple goals; using this larger perspective as a framework for understanding and influencing events and change (McLagan, 1989).	▪ Stories about organizational culture/history and experiences ▪ Descriptions of the likely impact of changes on different parts of an organization, work processes, or individuals.
Negotiating/ Contracting Skills : Organizing, preparing, overseeing and evaluating work performed by vendors, other contingent workers or outsourcing agents.	▪ Request for proposals ▪ Written or oral proposal to management or to clients ▪ Written and oral agreements ▪ Management plans for oversight of vendors, contingent workers, or outsourcing agents.
Buy-In/Advocacy Skills : Building ownership or support for change among affected individuals, groups, and other stakeholders.	▪ Action plans ▪ Agreements for action ▪ Support for change voiced by performers, performers' managers, process owners and/ or stakeholders.
Coping Skills : Knowing how to deal with ambiguity and how to handle the stress resulting from change and from multiple meanings or possibilities	▪ Strategies for managing stress and ambiguity ▪ Strategies for helping others manage stress and ambiguity ▪ Strategies for addressing resistance to change
Ability to see "Big Picture" : Looking beyond details to see overarching goals and results	▪ Descriptions of the impact of human performance improvement strategy on organizational plans, work processes, and individuals
Consulting Skills : Understanding the results that stakeholders desire from a process and providing insight into how efficiently and effectively those results can be achieved	▪ Flowcharts ▪ Policy and procedure preparation ▪ Written policies ▪ Written procedures ▪ Preparation of work standards/ expectations
Project Management Skills :** Planning, costing, organizing, resourcing, and managing complex projects	▪ Performance contracts ▪ Project goals ▪ Project task items ▪ Project milestones ▪ Project timelines ▪ Project resource requirements

	▪ Resource management ▪ Project budget

Tabel 3: Technical Competencies

A. Analyst Role	**Terminal Output**
Conducts troubleshooting to insolate the cause(s) of human performance gaps or one who indentifies area in which human performance can be improved	▪ Persuasive reports to stakeholders about past, present, and future performance gaps and their cause(s)
Analyst Competencies	**Enabling Outputs**
1. Performance Analysis Skills (Front-End Analysis) : The process of comparing the actual and ideal performance in order to identify performance gaps or opportunities.	▪ Models and plans to guide troubleshooting of human performance gaps ▪ Work plans to guide performance analysis ▪ Information on trends affecting existing or possible future performance gaps ▪ Tasks analysis ▪ Job analysis ▪ Observations
2. Needs Analysis Survey Design and Development Skills (Open-Ended and Structured) : Preparing written (mail), oral (phone) or electronic (e-mail) surveys using open-ended (essay) and closed (scaled) questions to identify human performance improvement needs	▪ Written (mail) surveys ▪ Oral (phone) surveys ▪ Electronic (e-mail) surveys ▪ Survey administration plans ▪ Research designs ▪ Data analysis and interpretation plans ▪ Report of needs analysis surveys ▪ Statistical summaries of needs analysis results ▪ Content analysis summaries of needs analysis results
3. Competency Identification Skills : Identifying the knowledge and skill requirements of teams, jobs, tasks, roles, and work (McLagen, 1989).	▪ Work portfolios ▪ Job descriptions ▪ Behavioral events interview guides ▪ Written critical incident survey

	questionnaires ▪ Competency models by function, process, organization or work category ▪ 360-degree assessments
4. Questioning Skill : Gathering information to stimulate insight in individual and group through use of interviews and other probing methods (McLagen, 1989).	▪ Interview guides ▪ Interview administration plans ▪ Content analyses of interview results ▪ Team meeting agendas and plans ▪ Focus groups* ▪ Interviews*
5. Analytical Skill (Synthesis) : Breaking down the components of a larger whole and reassembling them to achieve improved human performance.	▪ Strategies for analyzing the root cause(s) of performance gaps ▪ Fishbone diagrams ▪ Storyboards of problem events
6. Work Environment Analytical Skill : Examining work environments for issues or characteristics affecting human performance.	▪ Environmental scans ▪ Business/organization plans ▪ Team/group plans ▪ Process improvement strategies/plans
B. Intervention Specialist Role	**Terminal Output**
Select appropriate interventions to address the root cause(s) of performance gaps	▪ Persuasive report to stakeholders about the appropriate intervention(s) to close past, present or future performance gap(s)
Interventions Specialist Competencies	**Enabling Outputs**
1. Performance Information Interpretation Skills : Finding useful meaning from the results of performance analysis and helping performers, performers' managers, process owner, and other stakeholders to do so	▪ Written or oral briefings to performers, performers' managers, process owners, or other stakeholders about the results of performance analysis or cause analysis ▪ Useful information drawn from performance or cause analysis
2. Intervention Selection Skills : Selecting human performance improvement intervention that address the root cause(s) of performance gaps, rather than	▪ Approaches for choosing appropriate human performance improvement strategies to close performance gaps

symptoms or side effects	
3. Performance Change Interpretation Skills : Forecasting and analyzing the effect of intervention and their side effect	▪ Written and oral briefings to performers, performers' managers, process owners, or other stakeholders about the likely impact of change or of a human performance improvement intervention on processes, individuals, or the organization ▪ Problem-solving activities to lead performers, performers' managers, process owners, or other stakeholders to discover/ forecast the impact of an intervention's implementation on processes, individuals, or the organization
4. Ability to Assess relationship Among Interventions : Examining the effects of multiple human performance improvement interventions on parts of an organization, its interaction with customers, suppliers and distribution, and workers	▪ Written and oral briefings to performers, performers' managers, process owners, or other stakeholders about the likely impact of multiple interventions on processes, individuals or the organization ▪ Problem-solving activities to lead performers, performers' managers, process owners, or other stakeholders to discover/ forecast the impact of multiple interventions on process, individuals, or the organization
5. Ability to Identify Critical Business Issues and Changes : Determining key business issues and applying that information during the implementation of human performance improvement intervention	▪ Organizational analyses ▪ Process analyses ▪ Individual assessment ▪ White papers on improvement strategies ▪ Oral and Written briefings to performers, performers' managers, process owners, or other stakeholders about possible improvement strategies Customer satisfaction information/survey results
6. Goal Interpretation Skills : Ensuring	▪ Written or oral goals for human

that goals are converted effectively into actions to close existing or pending performance gaps; getting result despite conflicting priorities, lack of resources, or ambiguity	performance improvement ▪ Performance objectives for interventions ▪ Facilitated performance objectives
C. Change Manager Role	**Terminal Outputs**
Ensures that interventions are implemented in ways consistent with desired results and that they help individuals and groups achieve results	▪ Performance improvement intervention effectively monitored with participants and stakeholders ▪ Effective interpersonal interventions among participants and stakeholder of interventions ▪ Tracking system to compare actual and ideal performance and progress toward narrowing or closing performance gaps, or realizing performance opportunities as the intervention is implemented ▪ Oral and/or written agreements among most or all stakeholders about the results desired from the intervention ▪ Measurable financial or nonfinancial objectives to be achieved during after implementation of the intervention(s)
Change Manager Competencies	**Enabling Outputs**
1. Change Implementation Skills :** Understanding the nature of individual	▪ Plans for managing the change ▪ Effect involvement of stakeholders

and organizational change and applying that knowledge to effectively lead organizations successfully through change	▪ Individual and organizational needs in balance ▪ Conflict resolution utilized to resolve differences ▪ Process for surfacing issues ▪ Management understanding the dynamics of change
2. Change Impetus Skills : Determining what the organization should do to address the cause(s) of a human performance gaps at the present and in the future	▪ A convincing case made for the need for change ▪ Organizational sponsorship identified and secured ▪ Evidence of support obtained through commitment of resources ▪ Designs/action plans for introducing and consolidating interventions ▪ Designs/plans for reducing resistance to interventions ▪ Recommendations to management about management's role in introducing and consolidating change ▪ Recommendations to workers about their role in introducing and consolidating change
3. Communication Channel, Informal Network, and Alliance Understanding : Knowing how communication moves through an organization by various channels, networks, and alliances; building such channels, networks, and alliances to achieve improvements in productivity and performance	▪ Communication plans established to keep participants in change and stakeholders of change informed about the progress of the human performance improvement intervention
4. Groups Dynamics Process Understanding : Understanding how groups function; influencing people so that group, work, or individual needs are addressed (McLagan, 1989)	▪ Groups successfully observed ▪ Plans for influencing groups based on knowledge of small group development theory
5. Process Consultation Skills : Observing individuals and groups for their interactions and the effects of their interactions with other	▪ Group process observation forms ▪ Description to group members and individuals about the effects of their behavior on a group or an individuals

6. **Facilitation Skills :** Helping performers, performers' managers, process owners, or other stakeholders to discover new insights	▪ Plans for facilitating group discussions ▪ Plans for facilitating individual or group decision making and problem solving
D. Evaluator Role	**Terminal Outputs**
Assesses the impact of interventions and follows up on changes made, actions taken, and result achieved in order to provide participants and stakeholders with information about how well interventions are being implemented	▪ Written and oral reports to participants and stakeholders about the progress of an intervention ▪ Written or oral reports to the organization about performance ▪ Written or oral reports to the organization about progress of interventions ▪ Written or oral reports to the work groups or teams about their performance ▪ Written or oral reports to the work groups or team about progress of intervention ▪ Written or oral reports to the management about performance ▪ Written or oral reports to the management about interventions
Evaluator Competencies	**Enabling outputs**
1. **Performance Gap Evaluation Skills :** Measuring or helping others to measure the difference between actual performance and ideal performance	▪ Human performance improvement evaluation objectives ▪ Human performance improvement evaluation designs and plans ▪ Human performance improvement evaluation instruments ▪ Pre- and post- measures of workers performance ▪ Evaluation finding, conclusions, and recommendations ▪ Reports to management and workers on the outcomes of human performance improvement strategies
2. **Ability to Evaluate Results Against Organizational Goals :** Assessing how well the results of human performance	▪ Linkage of human performance improvement intervention to other change efforts of the organization

improvement intervention match intentions	▪ Linkage of human performance improvement intervention with other interventions ▪ Linkage of human performance improvement intervention to organizational plans, goals and objectives ▪ Linkage of human performance improvement intervention to organizational/business needs
3. Standard Setting Skills : Measuring desired results of an organizations, processes, or individuals; helping others to establish and measure work expectations	▪ Work standards/ expectations established ▪ Work standards/ expectations communicated
4. Ability to Assess Impact on Culture : Examining the effects of human performance gaps and human performance improvement interventions as well as shared beliefs and assumptions about "right" and "wrong" ways of behaving and acting in one organizational setting	▪ Linkage of human performance improvement interventions to organizational culture
5. Human Performance Improvement Intervention Reviewing Skills : Finding ways to evaluate and continuously improve human performance improvement interventions before and during implementation.	▪ Written and oral reports to stakeholders and participants about the progress of an intervention
6. Feedback Skills : Collecting information about performance and feeding it back clearly, specifically, and on timely basis to affected individuals or group (McLagan, 1989)	▪ Feedback to the organization about performance ▪ Feedback to the organization about progress of interventions ▪ Feedback to work groups or teams about performance ▪ Feedback to work groups or teams about progress of interventions ▪ Feedback to management about performance ▪ Feedback to management about interventions

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PERANAN STRATEGIS TIK DALAM DUNIA PENDIDIKAN
STRATEGI MENINGKATKAN DAYA SAING SDM INDONESIA

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Abstract

Tulisan ini memaparkan hal-hal terkait dengan bagaimana TIK berperan dalam dunia pendidikan, dan bagaimana perkembangan teknologi tersebut dapat dimanfaatkan untuk meningkatkan kualitas sumber daya manusia Indonesia. Untuk menggambarkan hal tersebut, paparan ini dibagi menjadi 4 (empat) pokok bahasan. Pada bagian pertama, pembahasan akan fokus pada aspek mengapa dan bagaimana TIK dapat menjadi pemicu terjadinya transformasi pada dunia pendidikan. Sementara bagian kedua akan memperlihatkan ragam peranan strategis apa saja yang dapat TIK berikan untuk meningkatkan kinerja mengajar-belajar dalam dunia pendidikan. Selanjutnya bagian ketiga akan membahas bagaimana penerapan TIK secara efektif akan dapat membawa nilai tambah bagi dunia pendidikan di tanah air, terutama dalam kaitannya dengan usaha untuk meningkatkan kualitas sumber daya manusia Indonesia. Dan akhirnya bagian keempat akan memperlihatkan berbagai tantangan yang dihadapi bangsa Indonesia dalam penerapan TIK untuk pendidikan dan potensi solusi apa saja yang dapat direkomendasikan untuk mengatasi masalah tersebut.

1 Pendahuluan

Perkembangan pesat teknologi informasi dan komunikasi (baca: TIK) telah merubah tata cara manusia bersikap dan berperilaku dewasa ini, terutama dalam kaitannya dengan proses komunikasi dan interaksi. Adalah merupakan suatu kenyataan bahwa hampir seluruh bidang industri dan aspek kehidupan masyarakat moderen tidak luput dari jangkauan teknologi ini, karena telah terbukti mampu mendatangkan sejumlah nilai dan manfaat signifikan bagi perkembangan jaman dan peradaban umat manusia. Kemajuan teknologi yang tumbuh pesat secara eksponensial ini telah menghasilkan sejumlah situasi yang tidak pernah terpikirkan sebelumnya oleh umat manusia. Fenomena seperti bumi terasa menjadi semakin kecil, masyarakat terkesan bertambah kritis, bisnis tumbuh jauh lebih dinamis, ekonomi bergerak secara fluktuatif, dan politik antar negara bergejolak tak menentu, hanya merupakan suatu tanda-tanda jaman dan bukti bahwa pada dasarnya dunia telah banyak mengalami perubahan yang sangat mendasar. Pendidikan sebagai sebuah proses dan industri, tidak terlepas pula dari jangkauan perkembangan teknologi ini. Bahkan petinggi dan peneliti UNESCO menilai

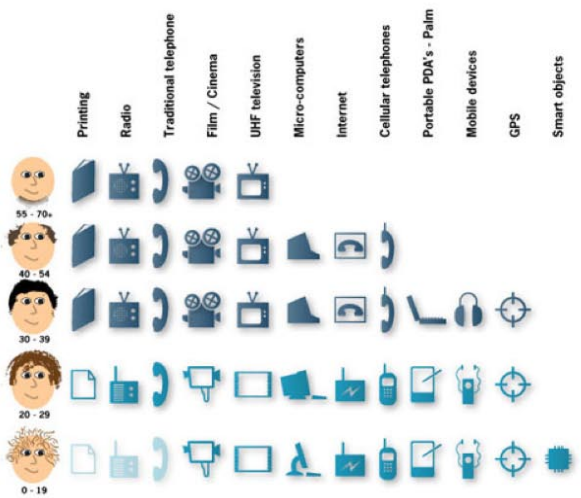
bahwa dampak terbesar dari perkembangan TIK di dunia ini justru akan menimpa sektor pendidikan (UNESCO, 1998). Diperkirakan puncak dari implementasi TIK dalam dunia pendidikan akan secara revolusioner berdampak pada terjadinya proses transformasi besar-besaran dalam proses mengajar-belajar di sekolah maupun pada lembaga atau institusi pendidikan formal lainnya, dari tingkat pendidikan dasar hingga pendidikan tinggi (Zucker, 2008). Terlepas dari telah begitu banyaknya pihak yang menerapkan dan mengimplementasikan TIK dalam institusi pendidikannya, tidak sedikit pula mereka yang masih mempertanyakan isu-isu seputar kenyataan ini, seperti: Bagaimana hal tersebut dapat terjadi? Aspek apa saja yang melatarbelakanginya? Mengapa perlu mencermati kecendurungan ini? Adakah peluang dan kesempatan yang dapat dimanfaatkan? Persiapan seperti apa yang harus dilakukan oleh para praktisi pendidikan?

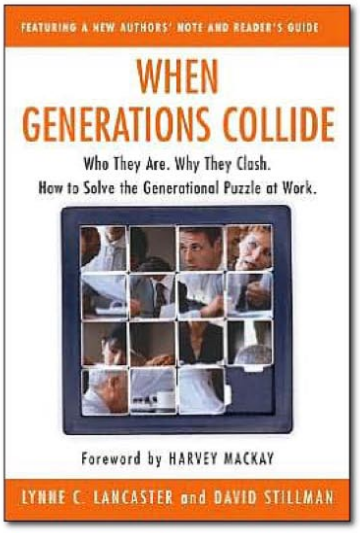
2 Konteks Keberadaan TIK dalam Pendidikan dan Pembelajaran

Ada sejumlah alasan mendasar dan sangat prinsip yang melatarbelakangi berbagai negara untuk berlomba-lomba melibatkan serta memanfaatkan teknologi informasi semaksimal mungkin untuk meningkatkan kualitas pembelajaran dan penyelenggaraan pendidikan yang dilakukan. Berikut adalah sejumlah alasan utama yang dimaksud.

2.1 Alasan 1: Perilaku Pembelajaran Generasi Terkini

Bayi yang lahir di atas tahun 90-an sudah biasa melihat berbagai teknologi informasi dan komunikasi dalam lingkungan kehidupannya sehari-hari. Berbeda dengan generasi lama yang ketika lahir baru ada televisi dan radio, generasi milenial ini lahir ketika teknologi semacam telepon genggam, komputer, SMS, PDA (Personal Digital Assistant), internet, games (Playstation, XBox, Nintendo, dsb.), dan piranti-piranti digital lainnya sedang dalam puncak perkembangannya. Sehingga tidaklah aneh jika dikatakan bahwa generasi ini sangatlah handal dalam menggunakan perangkat teknologi (baca: technology literacy), karena sumber daya ini telah menjadi bagian tak terpisahkan dari kehidupan mereka sehari-hari (Conrad et al., 2010).





Dalam perspektif cara pandang perilaku, mereka menganggap bahwa hampir semua aspek kehidupan saat ini berhubungan dan dapat diatur dengan keberadaan berbagai aplikasi teknologi, seperti yang dikenal dalam konsep seperti e-government, e-learning, e-procurement, e-democracy, dan lain sebagainya.

Terkait dengan proses pendidikan dan pembelajaran, generasi ini berada dalam empat domain berbeda yang bekerja secara simultan. Mereka belajar melalui interaksi dalam keluarga di rumah, melalui kegiatan pendidikan di sekolah, melalui aktivitas dan relasi dengan teman-teman komunitas di ranah-ranah publik, dan melalui proses berselancar di dunia maya (baca: internet). Berbagai statistik memperlihatkan bahwa dari hari ke hari, proporsi berinteraksi di dunia maya memperlihatkan kecenderungan meningkat secara cukup tajam – meninggalkan model komunikasi dan interaksi tradisional di rumah, sekolah, dan ranah publik. Artinya, bayi-bayi yang lahir pasca tahun 2000, akan memiliki pola belajar yang sangat berbasis teknologi; karena di mata mereka, ketika lahir, keberadaan konsep teknologi telah ada terlebih dahulu sebelum yang bersangkutan mengenal konsep sekolah. Mereka akan merasa asing jika melihat ada sebuah sekolah atau lembaga pendidikan yang tidak melibatkan teknologi dalam proses belajar mengajarnya.

VETERANS < 1946	BABY BOOMERS 1946-1964	XERS 1965-1980	MILLENIALS >1981
RUMAH	RUMAH	RUMAH	RUMAH
	SEKOLAH	SEKOLAH	SEKOLAH
		RANAH PUBLIK	RANAH PUBLIK
			DUNIA MAYA

2.2 Alasan 2: Evolusi Bentuk Sumber Daya Pembelajaran

Dalam dunia pembelajaran, jika diperhatikan secara seksama, telah terjadi empat kali revolusi besar-besaran karena ditemukannya empat buah konsep dan/atau produk "teknologi" dalam berkomunikasi. Pertama adalah ketika ditemukannya "konsep berbahasa". Dalam ranah prasejarah manusia, ketika individu-individu di dunia ini menemukan konsep "bahasa" sebagai alat berkomunikasi, maka mulailah jaman revolusi pembelajaran pertama. Mereka yang memiliki ilmu tertentu segera menularkannya ke orang lain, baik sanak saudara dari keluarga sendiri maupun pihak lainnya, demi berbagai tujuan kehidupan – mulai dari sekedar membantu mencari kebutuhan hidup (mencari makan dan minum, membuat pakaian, dan membangun tempat tinggal) sampai dengan membentuk sebuah komunitas sebagai alat pertahanan

(suku bangsa). Siapa saja yang sanggup menguasai bahasa verbal maupun non verbal, berpotensi menjadi "guru" dan "siswa" dalam kelompoknya. Kunci pembelajaran pada saat ini adalah kemampuan dalam berbahasa lisan.

Permasalahan yang timbul pada saat itu adalah adanya keterbatasan dalam proses penularan ilmu dari individu ke individu lainnya. Jika ada seorang guru utama atau "suhu" yang menguasai ilmu tertentu dan tiada bandingannya, maka siapapun yang berniat berguru dengannya harus bertatap fisik dengan yang bersangkutan karena harus saling berkomunikasi secara langsung.

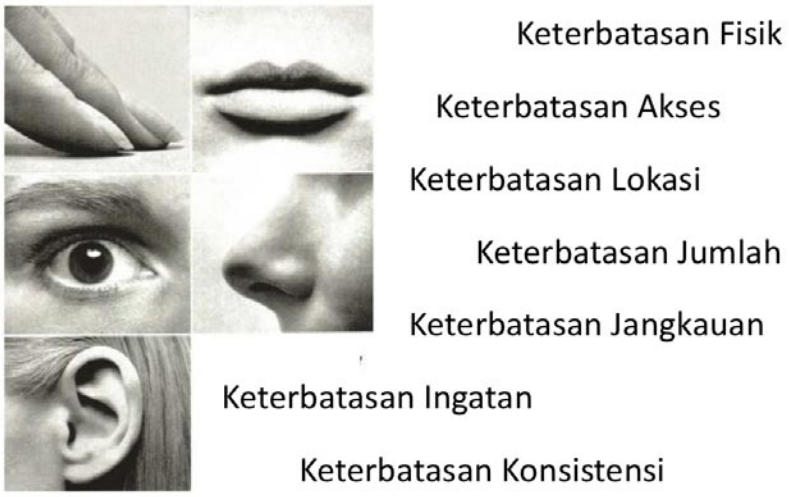
Pada saat inilah maka revolusi kedua terjadi, yang dipicu dengan ditemukannya konsep tulisan alfabet. Ilmu yang tadinya hanya "menempel" pada seseorang, yang semakin tua semakin hilang memori dan kemampuan penularannya, mulai dapat ditorehkan dalam berbagai berkas atau entitas seperti batu, kayu, daun lontar, kertas papirus, buku-buku, dan lain sebagainya. Dimulai dari era inilah maka pengetahuan atau ilmu sanggup "berkelana" dari satu tempat ke tempat lainnya, sejalan dengan perpindahan beraneka ragam berkas atau entitas tersebut. Contoh klasik adalah primbon rahasia jurus-jurus kung-fu yang diperebutkan berbagai perguruan bela diri, atau buku teknik operasi kedokteran yang dipelajari oleh institusi-institusi terkemuka di dunia, atau kumpulan rahasia pengobatan tradisional cina yang dicari oleh tabib-tabib manca negara, dan lain sebagainya. Permasalahan dalam era ini adalah keterbatasan dari sumber ilmu pengetahuan yang dimaksud, karena biasanya masing-masing sumber pengetahuan tersebut jumlahnya hanya ada satu (karena membuatnya cukuplah sulit dan memakan waktu yang lama). Oleh karena itu tidaklah heran jika bahan tersebut menjadi rebutan dari berbagai pihak, sehingga tidak heran jika wujudnya dari masa ke masa semakin hancur serta rusak karena adanya perpindahan tangan dan kepemilikan.

Sesuai dengan permasalahan yang dihadapi, revolusi ketiga mulai terjadi seiring dengan ditemukannya mesin cetak (baca: Gutenberg). Dengan ditemukannya teknologi memperbanyak berkas cetakan di atas kertas dalam waktu cepat, maka dimulailah era penerbitan koran dan majalah berkala lainnya. Tentu saja hal ini berpengaruh terhadap dunia penyebaran ilmu pengetahuan mengingat seluruh sumber-sumber pembelajaran yang tadinya berjumlah terbatas, dapat segera ditulis kembali dan dicetak dalam oplah atau volume yang besar. Satu-satunya permasalahan yang dihadapi ketika itu adalah masalah distribusi, karena untuk mengirimkan begitu banyak publikasi ke berbagai tempat diperlukan sumber daya yang tidak sedikit, dimulai dari kuda hingga kereta api atau bahkan kapal terbang. Tidak jarang dijumpai kasus dimana berita sudah sampai terlebih dahulu sebelum publikasi yang dikirimkan diperoleh pelanggan, atau bahkan biaya yang dipergunakan untuk mengirimkan kabar jauh lebih mahal dari pada nilai dari pesan itu sendiri.

Revolusi terakhir dalam dunia pendidikan dan pembelajaran terjadi ketika mulai ditemukan teknik digitalisasi dalam laboratorium komputer. Dengan adanya kemajuan teknologi ini, berkas-berkas berbasis teks dan gambar yang biasanya dicetak pada kertas, dapat disimpan dalam bentuk file elektronik. Bahkan tidak hanya itu, audio dan video yang dahulu harus disimpan secara fisik dalam bentuk pita rekaman, telah berhasil pula diubah formatnya menjadi file elektronik. Dengan telah berhasil ditransformasikannya entitas fisik menjadi file elektronik, maka proses penggandaan dan penyebaran dapat dilakukan secara super cepat. Hanya dalam hitungan detik, sebuah berkas digital dapat dikirimkan langsung ke seluruh penjuru dunia untuk segera dinikmati keberadaannya. Mengingat bahwa pada dasarnya buku, majalah, jurnal, artikel, suara, dan film dapat direpresentasikan dalam format file elektronik, maka tentu saja hal ini mendatangkan dampak yang sangat signifikan terhadap kemajuan teknologi pendidikan dan pembelajaran (Gaurav et al., 2003). Seorang peserta didik dapat dengan leluasa melakukan proses pembelajaran dari mana saja, kapan saja, dan di mana saja diinginkan, tanpa harus melakukan proses tunggu yang lama serta mahal (baca: on-demand learning).

2.3 Alasan 3: Keterbatasan Fisik dan Panca Indra Manusia

Secara filosofis, teknologi diciptakan untuk membantu manusia dalam melakukan aktivitasnya. Manusia perlu dibantu karena pada dasarnya kemampuan seorang individu sangatlah terbatas. Katakanlah dalam hal ingatan atau memori. Selain terbatasnya kemampuan mengingat-ingat suatu peristiwa atau kejadian, kecenderungan tingkat daya ingat seseorang menurun sejalan dengan pertambahan usia. Demikian pula terhadap keterbatasan panca indera. Seorang siswa misalnya, hanya dapat melihat atau mendengar hal-hal yang ada di sekitarnya saja, sehingga proses pembelajaran sangat terbatas pada lingkungan fisik atau lingkungan dimana guru dan siswa berada. Demikian pula dengan kemampuan seorang guru dalam mengajarkan sebuah materi kepada banyak siswanya, dimana tingkat konsistensi dan kualitasnya cenderung menurun karena lelah, bosan, fatik, dan lain-lain.



Dalam berbagai konteks keterbatasan ini, teknologi informasi dan komunikasi menawarkan berbagai terobosan dan solusi pemecahan masalah. Misalnya adalah kemampuan sebuah flash disk berkapasitas 2GB untuk menyimpan sekitar 100 rim kertas akan sangat membantu guru dan siswa dalam mengatasi masalah kemampuan daya ingat dan mereduksi volume fisik buku-buku referensi. Atau aplikasi tele conference maupun webcast yang memungkinkan seorang peserta didik untuk dapat menikmati ceramah atau kuliah seorang pengajar di lokasi geografis yang berbeda. Artinya, teknologi dalam konteks ini berfungsi untuk mengatasi berbagai kendala yang dihadapi karena keterbatasan panca indra manusia – dimana UNESCO menterjemahkan fungsi ini ke dalam definisi e-learning sebagai sebuah konsep dengan obyektif utama memenuhi kebutuhan pendidikan dan pembelajaran yang selama ini tidak dapat terselesaikan atau “to meet the unmet educational needs”.

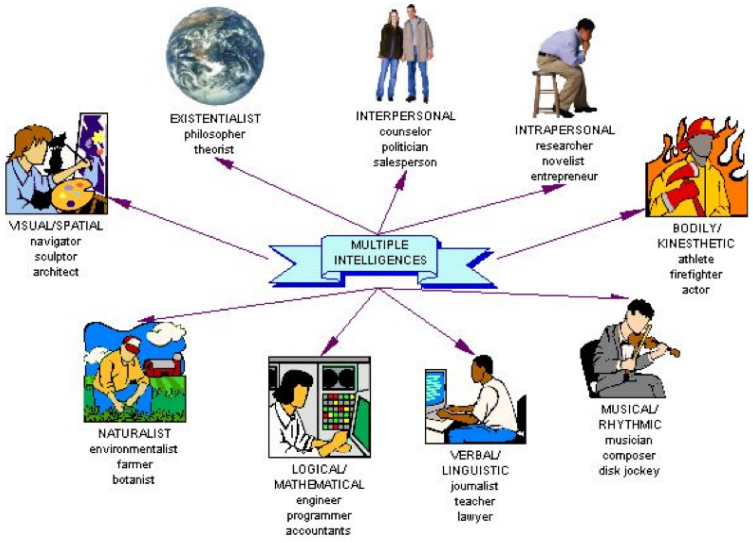
2.4 Alasan 4: Perbedaan Kecerdasan dan Ragam Gaya Belajar

Pada dasarnya setiap individu itu unik, karena diciptakan dengan kemampuan dan talenta yang berbeda-beda. Oleh karena itulah maka seorang pakar dari Harvard University memperkenalkan model spektrum tipe kecerdasan manusia.

Dalam konsep “multiple intelligence” atau kecerdasan majemuk ini, dikenal ada 9 (sembilan) jenis kecerdasan manusia, yaitu:

1. Kecerdasan Logika Matematis – terkait dengan kemampuan berfikir secara runtut dan terstruktur dalam memecahkan suatu persoalan;
2. Kecerdasan Verbal Linguistik – terkait dengan kemampuan berbahasa dan menggunakan bahasa sebagai alai komunikasi;
3. Kecerdasan Ritme Musik – terkait dengan kemampuan dalam memahami keteraturan bunyi dan menciptakan keindahan darinya;

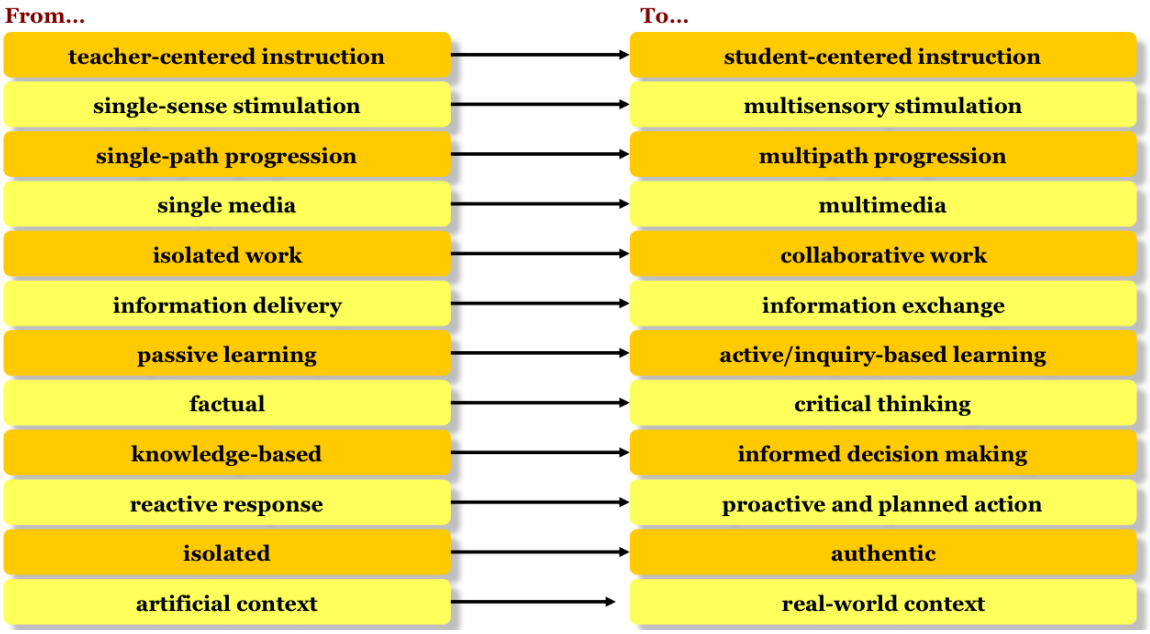
4. Kecerdasan Kinestetik Otot – terkait dengan kemampuan menggerakkan dan memfungsikan berbagai anatomi fisik manusia untuk berbagai tujuan atau obyektif tertentu;
5. Kecerdasan Intrapersonal – terkait dengan kemampuan dalam menggunakan kekuatan internal individu melalui proses pengendalian diri dan introspeksi ke dalam secara intensif;



6. Kecerdasan Interpersonal – terkait dengan kemampuan menjalin kerjasama dengan pihak-pihak eksternal di luar diri sendiri untuk menciptakan jejaring relasi yang bermanfaat;
7. Kecerdasan Eksistensi – terkait dengan kemampuan menjawab pertanyaan-pertanyaan mendasar mengenai asal usul suatu sebab dan menciptakan berbagai teori terkait dengannya;
8. Kecerdasan Visual Spasial – terkait dengan kemampuan memahami keteraturan dan keindahan suatu gambar maupun tata ruang entitas dua atau tiga dimensi untuk berbagai keperluan nyata; dan
9. Kecerdasan Naturalis – terkait dengan kemampuan memahami dan melaksanakan kegiatan yang ramah lingkungan dalam rangka menciptakan bumi yang lebih baik.

Mengingat bahwa pada dasarnya setiap manusia memilii kekuatan dan kecerdasan yang berbeda-beda, maka dapat diduga bahwa gaya belajar mereka pun pasti beraneka ragam. Dengan gaya belajar yang beranekaragam tersebut, sangat mustahil jika pendekatan proses belajar mengajar dilakukan secara homogen alias seragam (Beetham et al., 2007). Dalam kaitan ini, harus terjadi perubahan paradigma, pola pikir, dan perilaku dalam penyelenggaraan belajar mengajar di kelas seperti yang ditampilkan pada gambar berikut. Perubahan yang dimaksud antara lain:

- Dari model belajar mengajar dimana guru menjadi pusat perhatian, menjadi pola pembelajaran dimana peserta didik menjadi subyek yang lebih aktif;
- Dari pola interaksi yang hanya satu arah dimana guru berbicara dan siswa mendengar, menjadi suatu model interaksi yang melibatkan seluruh panca indera;
- Dari perspektif pembelajaran dimana setiap siswa memperoleh ilmu dan pengalaman yang sama, menjadi terjadinya akuisisi terhadap pengetahuan yang bervariasi dan beragam;

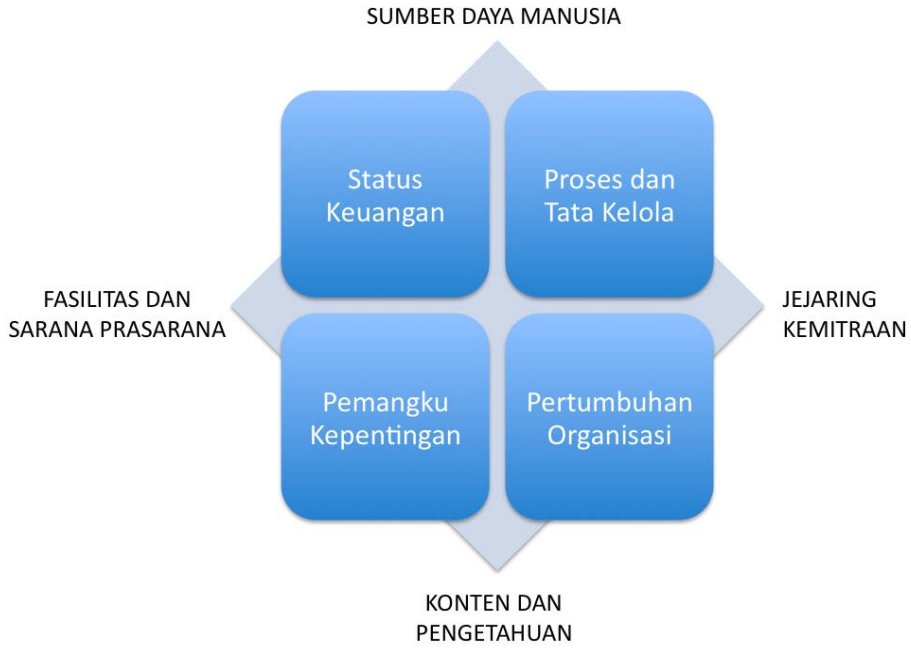


- Dari lingkungan belajar yang monoton, menjadi suatu lingkungan yang interaktif dengan menggunakan berbagai media dan fasilitas pendidikan;
- Dari lokasi pembelajaran yang terisolasi di kelas dan/atau laboratorium semata, menjadi tempat belajar mengajar yang bervariasi;
- Dari alur penyampaian pengetahuan yang satu arah, menjadi pertukaran ilmu pengetahuan dan kompetensi yang multi arah;
- Dari mekanisme pembelajaran yang pasif, menjadi sangat aktif karena terjadinya komunikasi multi arah antara seluruh peserta didik;
- Dari mempelajari hal-hal yang bersifat faktual dan historis, menjadi aktivitas berfikir secara lateral;
- Dari yang berbasis pengetahuan pasif untuk dihafalkan, menjadi latihan pengambilan keputusan berdasarkan ragam informasi yang diperoleh;
- Dari pembahasan suatu materi ilmu yang bersifat reaktif, menjadi lebih terencana dan holistik;
- Dari pembahasan kasus-kasus masa lalu yang telah terjadi dan bersifat historik serta tertutup, menjadi lebih otentik karena kontekstual; dan
- Dari konteks kejadian yang artifisial, menjadi peristiwa yang kongkrit.

Keseluruhan perubahan model pembelajaran ini sangat mustahil untuk dilakukan tanpa kehadiran teknologi informasi dan komunikasi yang memadai.

2.5 Alasan 5: Tuntutan Penyelenggaraan Proses yang Efektif dan Efisien

Dalam domain manajemen penyelenggaraan institusi pendidikan, terdapat sejumlah besar sumber daya yang dibutuhkan, seperti: manusia, fasilitas dan sarana prasarana, konten dan pengetahuan, serta jejaring kemitraan. Di mata pemilik dan pengelola organisasi, terkait dengan pemanfaatan berbagai sumber daya tersebut, tingkat kesuksesan dan keberhasilan kinerja dilihat dari empat sektor utama atau yang kerap dikenal dengan the Balanced Scorecard, yaitu: (i) Aspek Keuangan; (ii) Aspek Pemangku Kepentingan; (iii) Aspek Penyelenggaraan Proses Internal; dan (iv) Pertumbuhan Institusi secara Keseluruhan (Mason et al., 2007).



Teknologi informasi dan komunikasi dalam konteks ini dipergunakan untuk menjalankan dua fungsi utama, yaitu: fungsi pencapaian dan fungsi pengawasan. Fungsi Pencapaian adalah peranan teknologi informasi dan komunikasi dalam mendukung usaha manajemen strategis dan operasional agar dapat mencapai target kinerja yang berkualitas tinggi (baca: efektif dan efisien). Dengan menggunakan teknologi informasi, maka terbukti akan terjadi mekanisme kerja yang lebih cepat, lebih murah, dan lebih baik dalam organisasi – yang tentu saja sangat bermanfaat bagi para pemangku kepentingan. Hal tersebut sangat dimungkinkan untuk dicapai mengingat teknologi informasi dan komunikasi mampu mengeliminasi, mensimplifikasi, mengintegrasikan, dan mengautomatisasikan berbagai pekerjaan manual yang sekarnang masih kerap dilakukan oleh praktisi pendidikan. Dengan menerapkan konsep seperti business process reengineering, customer relationship management, datawarehousing, knowledge

management, dan lain sebagainya – implementasi teknologi informasi dan komunikasi di institusi pendidikan akan menemukan konteksnya.

Fungsi kedua yang diharapkan dapat didukung oleh teknologi informasi adalah masalah pengawasan kinerja manajemen, melalui cara implementasi konsep pengukuran kinerja operasional, seperti misalnya yang ditawarkan oleh Balanced Scorecard. Melalui aplikasi seperti Executive Information System, Management Information System, Decision Support System, Transactional Information System, Dashboard Management, dan lain-lain, dengan mudahnya seorang pimpinan dapat melakukan analisa terhadap berbagai aspek tata kelola organisasi. Tanpa dilibatkannya teknologi informasi dan komunikasi, akan sangat sulit sekali dilakukan proses pengawasan yang diinginkan, karena begitu banyaknya frekuensi dan volume transasksi serta interaksi yang terjadi setiap harinya.

3 Ragam Peran Strategis TIK bagi Dunia Pendidikan

Kurikulum Berbasis Kompetensi (KBK) mengisyaratkan bahwa seorang peserta didik harus memiliki ragam kompetensi kognitif, afektif, dan psikomotor. Bahkan secara jelas disampaikan bahwa dua jenis kompetensi dasar – dari sembilan buah yang dicanangkan - dalam KBK yang harus dimiliki peserta didik adalah Kompetensi Dasar Komunikasi dan Teknologi serta Kompetensi Dasar Komputer dan Internet. Alasan paling mendasar mengapa hal ini disarankan adalah karena berpegang pada prinsip bahwa bahan atau referensi belajar dapat berasal dari berbagai sumber, tidak semata terpaku pada buku yang dipergunakan di kelas. Demikian pula halnya dengan keberadaan pengajar. Guru atau dosen di dalam kelas berfungsi sebagai fasilitator, bukan satu-satunya sumber diseminasi pengetahuan – karena pada hakekatnya semua manusia di dunia ini dapat dan berpotensi sebagai "guru" bagi peserta didik. Dalam kaitan inilah maka peranan TIK yang pertama didefinisikan, yaitu sebagai sebuah sumber ilmu pengetahuan. Tentu saja TIK yang dimaksud di sini adalah internet, suatu jejaring raksasa yang mempertemukan dan mengintegrasikan seluruh pusat-pusat referensi pembelajaran yang ada di muka bumi ini (Kumail, 2002). Melalui internet, seorang mahasiswa di tanah Papua misalnya dapat dengan mudah mengakses perpustakaan yang ada di perguruan tinggi terkemuka dunia semacam Stanford University dan Cambridge University untuk menemukan referensi yang dibutuhkan. Atau seorang siswa sekolah dasar di Bukit Tinggi yang sedang giat-giatnya menekuni pelajaran ekstrakurikuler Bahasa Inggris dapat dengan leluasa mencari bahan-bahan terbaik dari negara sumbernya, seperti Amerika Serikat dan Inggris. Demikian halnya pula dengan seorang guru di Semarang yang kesulitan memperoleh contoh studi kasus untuk mengajar ekonomi dan koperasi dapat memperolehnya melalui internet dari Kementrian Usaha Kecil Menengah yang ada di seluruh dunia. Dalam konteks ini, secara seketika, seluruh individu memiliki hak akses yang merata di seluruh dunia, terutama terhadap berbagai pengetahuan dan produk-produk HAKI yang dihimpun oleh para praktisi pendidikan, industri, pemerintahan, komunitas, dan masyarakat. Jendela aplikasi pencari referensi atau perangkat lunak berselancar di internet semacam Google, Altavista, dan Yahoo,

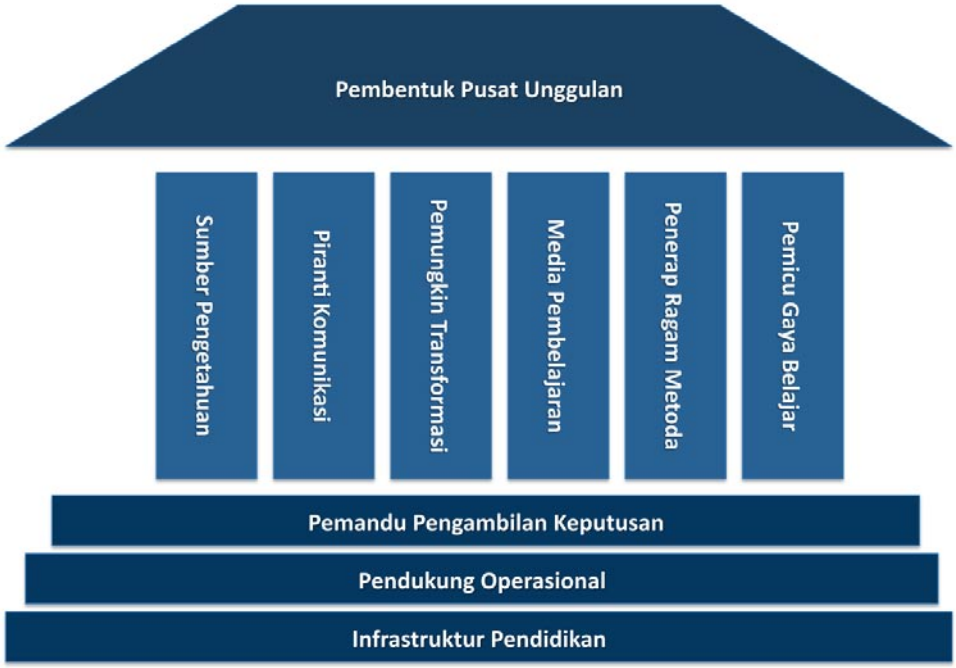
merupakan teknologi yang sangat tinggi nilai manfaatnya dalam perspektif ini. Demikian pula keberadaan situs-situs yang dapat menjadi sumber pembelajaraan seperti YouTube dan Wikipedia memperlihatkan bagaimana internet dapat meningkatkan kompetensi serta keahlian seorang peserta didik dalam waktu yang relatif singkat. Proses belajar menjadi semakin cepat dan menyenangkan.

Peranan strategis TIK yang kedua, masih dalam konteks KBK dan internet, adalah kenyataan bahwa internet tidak saja menjadi pusat sumber referensi, tetapi lebih jauh lagi menjadi tempat bertemunya para individu pembelajar itu sendiri. Dengan fasilitas aplikasi komunikasi seperti email, mailing list, chatting, dan blogging maka seorang siswa yang sedang belajar fisika di Balikpapan dapat berinteraksi dengan tokoh idolanya pemenang nobel fisika dari belahan bumi lain dengan leluasa. Tidak hanya itu, seorang mahasiswa yang mengalami kesulitan ketika sedang menyusun skripsi dapat berdiskusi dan bertukar pikiran dengan rekan-rekan sesama mahasiswanya dari perguruan tinggi lain tanpa harus beranjak dari lokasinya. Tentu saja selain menghemat biaya transportasi, model belajar bernuansa kelompok ini meningkatkan kualitas dan efektivitas hasil pembelajaran terkait (Isjoni, 1999). Dengan telah terkoneksinya internet di seluruh dunia dengan pengguna aktif sebanyak 1.8 miliar individu pada akhir tahun 2007, dapat dibayangkan betapa besar potensi peningkatan kualitas ilmu yang dapat dihasilkan melalui interaksi seluruh manusia yang ada – terutama dalam kaitannya dengan proses pendidikan. Jika proses komunikasi ini dilakukan secara benar, intensif, dan efisien, maka nischaya kendala kekurangan tenaga guru atau pengajar maupun keluhan terhadap rendahnya kualitas guru atau pengajar dapat teratasi dengan baik.

Dengan menggabungkan kedua peranan strategis TIK yang telah dipaparkan sebelumnya, maka akan didapatkan sebuah peranan yang menjadi penyebab terjadinya revolusi di dunia pendidikan, yaitu TIK sebagai media pemungkin (baca: driver) terjadinya transformasi pendidikan. Hal ini sejalan dengan filsafat pendidikan dan teknologi yang mengatakan bahwa dengan teknologi, manusia semakin lebih berpeluang untuk menciptakan perubahan yang bermanfaat bagi kehidupan yang lebih berkembang dan maju, karena teknologi pada dasarnya merupakan suatu sistem intelektual pemberdayaan manusia yang dihasilkan dari sistem kegiatan pendidikan. Dalam kaitan ini, proses digitalisasi terhadap sumber daya pendidikan dan proses pendidikan melahirkan berbagai inisiatif penyelenggarakan kegiatan mengajar-belajar dengan memanfaatkan internet sebagai media penembus batas ruang dan waktu.

Sebuah sekolah di pedesaan yang tidak memiliki fasilitas perpustakaan lengkap dengan konsep e-library dapat menambah koleksi referensinya secara sangat signifikan karena dihubungkan dengan perpusakaan nasional. Sebuah universitas yang tidak pnya ahli komputer robotika dapat menyelenggarakan mata kuliah yang bermutu karena menerapkan konsep e-learning dengan perguruan tinggi di Jepang (Wen, 2003). Seorang dosen yang sedang melakukan riset dapat berkolaborasi dengan mudah dengan rekan-rekan akademisi lainnya yang tersebar di seluruh dunia dengan memanfaatkan aplikasi e-research. Seorang mahasiswa magister tingkat akhir dapat diuji thesisnya oleh para pakar akademisi di bidangnya melalui piranti e-conference. Beraneka ragam konsep,

produk, dan/atau jasa yang kerap dimulai dengan inisial "e-" ini pada dasarnya ingin menawarkan suatu metode interaksi yang dibutuhkan oleh dunia pendidikan, tetapi selama ini belum pernah dapat dilaksanakan secara efektif karena belum adanya teknologi pendidikan yang sanggup mewadahinya. Secara tegas dan bijaksana UNESCO mendefinisikan obyektif dari proses "e-education" ini sebagai: "to meet the unmet educational needs…"



Peranan TIK selanjutnya, yaitu keempat, adalah dengan menjadikan teknologi pendidikan ini sebagai pendukung pengajar maupun peserta didik untuk mengatasi keterbatasan panca indera dalam menyerap, mengolah, mengorganisasikan, menyampaikan, mengelaborasikan, menyimpulkan, dan mengimplementasikan berbagai khasanah pengetahuan dan kompetensi yang menjadi obyek pembelajaran. Dengan menggunakan animasi yang diunduh dari internet, seorang guru dapat mengilustrasikan bagamana sistem peredaran darah manusia terjadi. Melalui aplikasi tabel periodik, maka seorang siswa dapat secara bebas melakukan eksperimen mencampurkan berbagai jenis zat atau atom yang dikenal oleh manusia tanpa intervensi dari pihak manapun. Dengan menggunakan pendekatan permainan (baca: game), sekelompok siswa secara giat berkolaborasi untuk dapat memecahkan teka teki logika yang menjadi obyektif pembelajaran secara mengasyikkan. Melalui piranti kamera tersembunyi misalnya, guru bersama-sama dengan siswa dapat melakukan pengamatan langsung terhadap obyek penelitian, seperti perilaku manusia dalam berlalu-lintas, jalannya proses operasi katarak oleh dokter bedah, tingkah laku anak balita dalam bermain, dan lain sebagainya. Disamping itu dewasa ini berkembang pula beraneka ragam modul aplikasi berbasis "edutainment" yang sangat digemari siswa untuk mengasah kemampuan intelektualnya dan keterampilannya; terutama dikembangkan guna meningkatkan minat belajar mereka terhadap mata ajar yang dipandang sulit atau "menyeramkan" seperti: matematika,

fisika, dan kimia. Melalui modul-modul ini, siswa dapat melakukan proses pembelajaran secara mandiri (Johnson, 2008).

Peranan kelima dari TIK adalah sebagai komponen atau bagian tak terpisahkan (baca: terintegrasi) dari kerangka kurikulum dan metode pendekatan mengajar-belajar yang disusun (Dakir, 2004). Salah satu strategi pembelajaran berbasis kompetensi adalah dengan mengimplementasikan beragam metode instruksional sekaligus, seperti model studi mandiri, simulasi, insiden, bermain peran, praktikum, eksperimen, dan lain-lain (Yamin, 2003). Contohnya adalah untuk mata ajar sejarah, dimana seorang guru memberikan tugas kepada peserta didik untuk meneliti mengapa Napoleon kalah di Waterloo dengan cara melakukan studi literatur di internet. Hasilnya sangatlah mengejutkan bagi siswa maupun guru karena ternyata dari empat puluh siswa di kelas yang mengerjakannya, terdapat empat puluh jawaban yang berbeda karena beragamnya sudut pandang yang dipergunakan. Secara pedagogis, intinya adalah bukan pada benar tidaknya jawaban siswa, tetapi bagaimana dalam proses menjawab pertanyaan tersebut siswa berusaha untuk mencari data/informasi yang relevan, memilah-milahnya secara hati-hati, melakukan pengolahan ragam fakta yang ada, mencoba mencari relasi antar kejadian-kejadian, hingga menyimpulkan fenomena yang dipelajari (Jogiyanto, 2006). Sang guru pun menjadi semangat untuk datang ke kelas, untuk "belajar" dari para siswanya yang telah berhasil melakukan penelitian sederhana melalui tugas yang diberikan tersebut. Kelaspun menjadi menyenangkan, proses belajar pun menjadi mengasyikkan.

Berikutnya adalah peranan TIK yang keenam bagi pengajar dan peserta didik adalah sebagai alat pemicu atau penyeimbang gaya belajar individu yang bermacam-macam karena berbedanya tingkat dan ragam kecerdasan manusia (Hoerr, 2007). Konsep kecerdasan majemuk yang sifatnya unik bagi masing-masing individu menggambarkan perlunya proses kustomisasi terhadap bahan ajar dan metode pendekatan pembalajaran agar menjadi semakin efektif (Armstrong, 2002). Dalam konteks inilah maka setiap peserta didik dipersilahkan dan dimungkinkan untuk men-"tailor made" sendiri referensi, bahan ajar, dan pendekatan pembelajarannya dengan tetap berada dalam koridor sistem pendidikan yang ditetapkan pengajar. Dengan kata lain, heterogenitas karakterisik peserta didik harus diimbangi dengan heterogenitas dalam mekanisme dan model pembelajaran agar sesuai dengan gaya belajar dan kemampuannya. Di sinilah TIK yang dibangun dengan menggunakan arsitektur informasi dan aplikasi modular dapat menemukan konteksnya yang signifikan. Siswa A yang lebih menyenangi model pemahaman secara deduktif memiliki fitur aplikasi TIK yang berbeda dengan Siswa B yang lebih menyukai model induktif. Demikian pula dengan Siswa C yang lebih merasa nyaman dengan materi yang kaya akan ilustrasi gambar spasial akan memiliki fitur aplikasi TIK yang jauh berbeda dengan Siswa D yang lebih suka dengan materi cerita (baca: verbal) atau Siswa E yang lebih memilih pendekatan logika dalam penjelasan mata ajarnya. Intinya adalah bahwa TIK memberikan pilihan model pembelajaran yang fleksibel dan adaptif bagi setiap individu yang memiliki gaya belajar berbeda, sehingga mereka yang ingin menggunakan model "action learning" misalnya (McGill, 1992),

atau yang lebih senang memakai paradigma konstruktivistik (Yamin, 2008), atau bahkan pendekatan "home schooling" yang sedang menjadi wacana publik, dapat diadopsi secara efektif (Suardiono, 2007).

Jika keenam peran TIK yang telah dikemukakan sebelumnya memiliki keterkaitan erat dengan guru atau dosen sebagai pengajar dan siswa sebagai peserta didik, maka peran ketujuh TIK dalam dunia pendidikan lebih mengarah pada unsur pengelolaan institusi pendidikan seperti sekolah dan kampus. Peranan yang dimaksud adalah kemampuan TIK sebagai teknologi penunjang manajemen operasional institusi pendidikan, agar pengolahan berbagai sumber daya yang dimiliki dapat terjadi secara efektif, efisien, optimal, dan terkontrol dengan baik. Pemanfaatan aplikasi manajemen kelas dan mata ajar misalnya (baca: course/class management system), akan mempermudah terlaksananya proses operasional dan administrasi pembelajaran secara terintegrasi, yang selama ini masih dikelola secara manual, seperti: mekanisme absensi, penggandaan bahan ajar, pelaksanaan ujian, penghitungan nilai evaluasi, hingga pemberitahuan hasil belajar. Aplikasi lain yang tidak kalah pentingnya misalnya terkait dengan pengisian rencana studi untuk mahasiswa perguruan tinggi, atau pengelolaan kegiatan ekstrakurikuler untuk sekolah menengah atas, atau manajemen keuangan lembaga yang diperlukan yayasan pendidikan, dan lain-lain (Mulyono, 2008). Penerapan lebih lanjut terhadap aplikasi TIK dalam aspek manajemen dan admnistrasi operasional akan terus berkembang ke arah inovasi berbagai proses dan jasa-jasa lainnya, seperti: kemudahan orang tua dalam memantau nilai putra putrinya melalui SMS pada telpon genggam, kemungkinan melakukan pemesanan buku perpustakaan melalui PDA (Personal Digital Assistant), kemudahan melakukan penyetoran uang sekolah, kemungkinan memberikan surat keteragan dokter ketika siswa bersangkutan sakit, dan lain sebagainya (Fattah, 2004).

Peran kedelapan TIK dalam dunia pendidikan ditujukan bagi para pimpinan dan pengelola institusi sebagai pemegang otoritas tertinggi dalam pengambilan keputusan. Melalui penerapan aplikasi seperti MIS (Management Information System), DSS (Decision Support System), TIS (Transactional Information System), datawarehouse, dashboard, dan sejenisnya – pemilik dan penyelenggara lembaga pendidikan dapat melakukan pemantauan terhadap pelaksanaan proses penyelenggaraan mengajar-belajar di institusi terkait. Syarat dari proses pengambilkeputusan adalah tersedianya informasi yang lengkap dan berkualitas. Informasi yang dimaksud pada dasarnya diambil dari seluruh data hasil rekaman pada proses operasional dan administrasi sehari-hari (Oriondo, 1984). Dengan menggunakan fitur pembuatan laporan berdasarkan kriteria dan filter tertentu, ditambah melalui kemampuan untuk melakukan analisa "what if", seorang kepala sekolah atau dekan dapat melakukan kajian terhadap unit pendidikan yang dipimpinnya guna pengambilan keputusan secara tepat (Morin, 2005). Melalui aplikasi ini, dapat diketahui hal-hal strategis sebagai berikut: indeks kinerja dosen dari hasil evaluasi mahasiswa, tingkat utilisasi ruang kelas dan fasilitas mengajar-belajar lain, rata-rata indeks prestasi kumulatif siswa, profil absensi tenaga pengajar, dan lain-lain (Rochaety, 2006).

Peran TIK yang kesembilan diperoleh dari kenyataan bahwa pada akhirnya, untuk dapat menjalani keseluruhan kapabilitas teknologi yang telah dipaparkan di atas, TIK harus dapat menjadi salah satu infrastruktur penting yang dimiliki institusi pendidikan. Dalam kaitan ini, sebuah sekolah atau kampus harus memiliki koneksi transmisi data dengan cara terhubung langsung ke infrastruktur telekomunikasi, baik melalui jalur terestrial, kabel laut, maupun satelit. Kemudian di atas infrastruktur tersebut, perlu dibangun sebuah jaringan komputer yang dapat menghubungkan berbagai piranti elektronik dan/atau digital yang ada di lingkungn institusi pendidikan terkait. Hanya dengan jejaring inilah maka keseluruhan inisiatif pengembangan TIK sebagai media teknologi pendidikan dapat terwujud (Syukur, 2002). Perlu diperhatikan bahwa komputer bukanlah merupakan satu-satunya jenis TIK yang dipergunakan dalam dunia pendidikan. Piranti keras lain seperti PDA, telepon genggam, web-TV, dan smart phone hanyalah sejumlah contoh dari beraneka ragam "digital gadget" yang telah tersedia di pasar. Oleh karena itulah maka infrastruktur TIK yang dibangun haruslah bersifat terbuka terhadap berbagai jenis kemungkinan penggunaan piranti teknologi yang dipakai oleh segenap pemangku kepentingan.

Dan pada akhirnya peranan TIK yang terakhir, atau kesepuluh, adalah untuk mengubah institusi pendidikan yang telah menerapkan sebagian atau keseluruhan peran TIK tersebut menjadi sebuah pusat unggulan atau "center of excellence" bagi lembaga-lembaga pendidikan sejenis lainnya. Hal ini mengandung arti bahwa siapapun yang dapat menghubungkan dirinya dengan institusi penerap TIK ini – tidak perduli yang bersangkutan adalah individu, kelompok masyarakat, organisasi, atau lembaga badan hukum – akan langsung mendapatkan keseluruhan manfaat yang dirasakan oleh pemangku kepentingan (baca: stakeholder) dari institusi pendidikan tersebut. Artinya adalah bahwa sebuah institusi pendidikan yang telah menerapkan TIK berpotensi menjadi "mercu suar" pengetahuan bagi masyarakat di sekitarnya maupun lembaga-lembaga lain yang ingin menjalin kerjasama dengannya (Miarso, 2004). Fenomena yang didasari oleh Hukum Metcalfe ini merupakan ciri khas atau karakteristik dari TIK yang tidak dimiliki oleh teknologi lainnya.

Seperti yang digambarkan pada ilustrasi "rumah peranan TIK" sebelumnya, terlihat bahwa kesepuluh peranan tersebut dapat dibagi menjadi 3 (tiga) bagian. Bagian pertama merupakan fundamental utama pembentuk rumah tersebut yang merupakan tiga peranan TIK bagi institusi pendidikan. Bagian kedua terdiri dari 6 (enam) pilar peranan TIK yang sangat erat kaitannya dengan pemanfaatan teknologi pendidikan untuk meningkatkan kualitas mengajar-belajar yang dilakukan oleh tenaga pengajar dan peserta didik. Dan bagian ketiga yang merepresentasikan atap rumah merupakan peranan TIK yang dapat mendatangkan manfaat bagi masyarakat sekitar.

4 Nilai Tambah TIK bagi Dunia Pendidikan Nasional

Meningkatkan kualitas penyelenggaraan kegiatan belajar-mengajar di institusi pendidikan akan berdampak langsung terhadap peningkatan kualitas sumber daya manusia pembelajar yang ada di lingkungannya. Dengan berpegang pada kesepuluh

peranan TIK yang telah dipaparkan, maka sejumlah permasalahan klasik yang menimpa dunia pendidikan di tanah air dapat teratasi.

4.1 Keterbatasan Kuantitas Sumber Daya Pendidikan

Di negara dengan populasi sekitar 250 juta ini aspek keterbatasan sumber daya pendidikan menjadi isu penting yang tak berkesudahan. Terbatasnya jumlah guru dan dosen dengan kualifikasi pendidikan tertentu, terbatasnya jumlah referensi pendidikan yang dapat dipergunakan siswa, terbatasnya jumlah sekolah bermutu yang dapat diandalkan, terbatasnya jumlah perpustakaan pendidikan yang dapat diakses, dan terbatasnya jumlah laboratorium untuk praktek, hanyalah merupakan sejumlah contoh keterbatasan yang dimaksud. Dengan membangun jejaring kerjasama antar sekolah melalui pemanfaatan TIK seperti yang telah dipaparkan sebelumnya, maka masalah keterbatasan ini dapat teratasi melalui konsep berbagi pakai sumber daya (baca: shared resources). Misalnya adalah lima buah sekolah yang bersepakat untuk bersama-sama "urunan" mendirikan sebuah laboratorium internet yang dapat dipergunakan bergantian secara fisik maupun simultan secara non-fisik (baca: logika). Dengan adanya kapabilitas TIK yang dapat menembus batas ruang dan waktu semacam ini, maka hal yang sama dapat diberlakukan bagi tenaga pengajar yang secara fisik hanya dapat berada di satu lokasi dalam satu waktu, tetapi secara non-fisik dapat berada di beberapa tempat sekaligus untuk "melayani" berbagai kebutuhan pembelajaran secara simultan.

4.2 Kesenjangan Kualitas Sumber Daya Pendidikan

Selain kuantitas, isu kualitas terkait dengan sumber daya pendidikan Indonesia juga kerap mengemuka belakangan ini. Baru sedikit terdapat program studi dengan nilai akreditasi A, belum banyak institusi pendidikan dasar yang dikategorikan sebagai sekolah nasional plus, masih dapat dihitung dengan jari sekolah-sekolah yang berstandar internasional, tidak banyak perpustakaan dengan koleksi jurnal ilmiah internasional yang lengkap, hanya satu dua perguruan tinggi yang memiliki super komputer – hanyalah beberapa contoh bagaimana kualitas masih belum merata dimiliki oleh institusi-institusi pendidikan nasional. Dengan diimplementasikannya TIK secara benar, maka nischaya terdapat kesempatan yang sama bagi institusi-institusi pendidikan untuk dapat menghubungkan dirinya dengan pusat-pusat pembelajaran yang dikategorikan unggul secara kualitas, tidak saja di dalam negeri, namun dapat mencakup wilayah regional bahkan internasional. Sebuah sekolah tinggi dengan akreditasi C dapat meningkatkan kualitasnya dengan menjalin kerjasama dengan perguruan tinggi terbaik di Singapura misalnya, atau guru di sebuah sekolah kejuruan dapat dengan leluasa belajar dari rekan sejawatnya yang berada di sebuah perusahaan terkemuka. Dengan demikian, maka diharapkan terjadinya penularan kualitas secara cepat dari sumber daya pendidikan yang dikategorikan unggul ke sekolah-sekolah, kampus-kampus, dosen-dosen, guru-guru, perpustakaan-perpustakaan, laboratorium-laboratorium yang masih dalam tahap berkembang.

4.3 Ketidakmerataan Kesempatan Memperoleh Pendidikan

Secara tidak langsung, melalui manfaat peningkatan kuantitas dan kualitas yang telah disampaikan di atas, permasalahan klasik terkait dengan pemerataan kesempatan memperoleh pendidikan bermutu bagi seluruh masyarakat Indonesia dalam rangka meningkatkan kecerdasan bangsa dengan sendirinya dapat segera terwujud. Konsep Universitas Terbuka yang telah mampu menjangkau seluruh masyarakat hingga ke daerah terpencil dapat segera diikuti dengan penerapan konsep "sekolah terbuka" atau "perpustakaan terbuka". Tidak ada alasan lagi bagi siapapun di republik ini untuk dapat memperoleh kesempatan untuk mengenyam pendidikan, sejauh yang bersangkutan hidup di lokasi yang telah terjangkau listrik dan telepon – atau paling tidak berada cukup dekat dengan warung internet. Sejauh peserta didik yang bersangkutan bersemangat untuk belajar keras, dan institusi pendidikan yang ada mau merubah paradigma penyelenggaraan model pendidikannya, maka dengan bantuan TIK, segala keterbatasan-keterbatasan tersebut dapat diatasi permasalahannya. Rintangan terbesar dalam menerapkan pendekatan ini biasanya terdapat pada keinginan untuk berbagi ilmu, pengetahuan, dan konten pendidikan – terutama dari pemilik HAKI terhadap mereka yang membutuhkannya. Oleh karena itu perlu dipikirkan lebih lanjut model pengelolaan HAKI yang tepat agar seluruh pihak bersemangat untuk melakukan proses pemerataan ini.

4.4 Model dan Pendekatan Pendidikan yang Kurang Relevan

Semakin cepatnya perkembangan ilmu dan perubahan di dunia ini menuntut setiap manusia dan institusi pendidikan untuk selalu memperbaharui dirinya dengan cara-cara pembelajaran yang relevan dengan kebutuhan perubahan itu sendiri. Dan seperti diketahui, tidak mudah untuk melakukan perubahan secara internal maupun eksternal dalam sebuah institusi pendidikan, tanpa dihadapkan pada berbagai isu rintangan dan resiko yang tidak kecil. Jika diamati secara sungguh-sungguh, TIK sebenarnya berpotensi menawarkan berbagai kemungkinan perubahan paradigma penyelenggaraan kegiatan mengajar-belajar dengan pendekatan operasional yang dapat disesuaikan dengan kondisi lapangan. Bagaimana TIK dapat dimanfaatkan untuk dapat secara evolusioner maupun revolusioner mengubah model pendidikan yang ada sepenuhnya sangat tergantung dari situasi dan kondisi masing-masing institusi yang bersangkutan. Bahkan berkaca dari negara-negara maju yang telah berhasil melakukannya, cukup banyak lembaga yang menerapkan secara perlahan-lahan namun pasti – sebelum pada akhirnya menemui satu titik dimana transformasi yang sebenarnya dilakukan. Melalui penerapan TIK untuk membantu melakukan proses pendidikan berbasis kasus, mempelajari suatu teori melalui model simulasi, menggambarkan suatu ilustrasi proses dengan animasi, dan menyelenggarakan pra ujian evaluasi secara mandiri, maka model pendidikan yang dilakukann akan semakin relevan dengan kebutuhan dunia industri atau dunia nyata.

4.5 Keterbatasan Biaya Pengembangan Institusi

Ada hal yang menarik untuk dipelajari jika melihat bagaimana negara-negara berkembang lainnya - yang dulu tertinggal jauh dari Indonesia namun saat ini telah begitu tinggi tingkat daya saingnya – menempatkan TIK dalam konteks pendidikan nasionalnya. Mereka menilai bahwa ukuran kesiapan dan/atau keberhasilan sebuah lembaga pendidikan tidak semata-mata terlihat dari aspek aset fisik semata, namun lebih jauh lagi ditinjau dari segi seberapa efektifnya komunitas manusia pembelajar di lingkungan terkait melakukan proses akuisisi ilmu dan kompetensi yang dibutuhkan untuk meningkatkan kualitas hidupnya, dan bagaimana aktivitas pengumpulan dan pengorganisasian modal intelektual (baca: intellectual capital) yang dihasilkan mereka dikelola secara baik.

Singkat kata, keterbatasan sumber daya finansial yang mereka miliki tidak secara langsung dan semata-mata dialokasikan untuk mengembangkan infrastruktur dan fasilitas fisik sekolah, namun diprioritaskan pula untuk mengadakan paling tidak satu atau dua komputer yang terhubung ke internet. Piranti TIK inilah yang menjadi motor penggerak pemangku kepentingan dalam mencari berbagai sumber pendanaan dari pihak-pihak terkait lainnya melalui mekanisme saling menguntungkan yang bermuara pada pertukaran barang atau jasa intelektual yang dimiliki oleh komunitas institusi pendidikan tersebut. Lihatlah bagaimana sebuah daerah terpencil di tanah air berhasil memiliki pusat belajar (baca: sekolah) yang berkualitas moderen “hanya” karena berhasil meyakinkan pihak mitra bisnis untuk menjalin kerjasama dengan usaha kecil menengah di daerahnya melalui pengembangan kelas pembimbingan khusus di sekolah

yang bersangkutan melalui fasilitas e-learning. Sebuah kampus di daerah perbatasan yang cukup jauh dari keramaian berhasil pula membangun fasilitas pendidikannya melalui kerjasama di bidang riset kelautan dengan negara tetangga, yang difasilitasi oleh jejaring TIK yang dibangun kedua belah pihak. Ada pula sebuah kampus yang berhasil meyakinkan industri manufaktur besar yang ada di daerahnya untuk mengalihdayakan (baca: outsource) divisi riset dan pengembangan (baca: R&D) ke institusi pendidikan terkait, tentu saja dengan cara membangun jejaring e-research di antara kedua organisasi ini. Segala jenis keterbatasan sumber daya finansial untuk membangun institusi dapat dengan mudah diatasi melalui inovasi-inovasi pemanfaatan TIK yang tepat.

4.6 Ketiadaan Lingkungan Akademik yang Kondusif

Tidak semua institusi pendidikan dasar, menengah, dan tinggi memiliki lingkungan akademik yang kondusif untuk belajar dan berkarya mengembangkan diri. Hal ini disebabkan oleh berbagai faktor, seperti: gaya kepemimpinan manajemen yang berbeda, filosofi penyelenggaraan institusi pendidikan yang dianut, keterbatasan sarana prasarana, nilai-nilai kemandirian dan kemanusiaan yang ditanam, dan lain sebagainya. Cukup banyak peserta didik yang mengeluh bahwa dirinya kurang dapat memperoleh kesempatan dalam memaksimalkan potensi yang dimilikinya untuk berkarya. Keadaan lingkungan tempat yang bersangkutan menempa ilmu kerap dijadikan kambing hitam penyebab terjadinya permasalahan ini. Terlepas dari benar tidaknya institusi yang dimaksud, diperlukan waktu cukup lama untuk membentuk suatu lingkungan akademik seperti yang setiap insan pendidikan dambakan. Dalam konteks ini, TIK sebenarnya menawarkan suatu jalan pintas bagi mereka yang benar-benar ingin memaksimalkan dirinya di dalam suatu lingkungan akademik yang telah matang (baca: mature), untuk menggunakan berbagai fitur dan kapabilitas teknologi yang telah tersedia. Melalui pemanfaatan TIK, seorang dosen dapat langsung terjun ke dinamika perdebatan akademik di MIT (Massachusetts Institute of Technolog) atau di Curtin University of Technology tanpa kesulitan dengan cara bergabung di mailing list atau newgroup terkait. Seorang mahasiswa dapat langsung merasakan panasnya perdebatan antar mahasiswa sedunia mengenai isu-isu seputar demokrasi melalui forum maya yang disediakan oleh George Washington University dan National University of Singapore misalnya. Tidak lagi menjadi hambatan bagi seorang peneliti untuk dapat aktif melakukan kajian secara kolaboratif melalui TIK dengan kolega-koleganya yang ada di belahan dunia lain.

4.7 Kecilnya Kesempatan Pengembangan Diri

Keluhan lain yang kerap disampaikan adalah sedikit dan kecilnya kesempatan dalam aktivitas pengembangan diri bagi tenaga pengajar maupun peserta didik. Terbatasnya tawaran bea siswa nasional, mahalnya biaya sertifikasi internasional, jarangnya diselenggarakan konferensi ilmiah, dan sedikitnya diterbitkan jurnal-jurnal berbobot hanya merupakan sejumlah situasi yang meperlambat proses pengembangan diri seseorang baik sebagai tenaga pengajar maupun peserta didik. Melalui aplikasi webcast, siapapun dapat mengikuti perkuliahan berstandar internasional dari berbagai lembaga

pendidikan, pemerintahan, maupun industri swasta secara cuma-cuma untuk menambah wawasan pengetahuannya. Dengan memanfaatkan "search engine" atau aplikasi "content browser", alumni perguruan tinggi dapat mencari ribuan tawaran bea siswa untuk bersekolah di luar negeri. Demikian pula telah sangat banyak tersedia tawaran program sertifikasi kompetensi kognitif dan keahlian yang dapat diperoleh secara mandiri melalui internet, dengan penyelenggaraan e-learning yang berkualitas dan dapat dipertanggungjawabkan keabsahan serta kinerjanya.

4.8 Keengganan untuk Berubah dan Berbenah Diri

Akhirnya musuh terbesar dari perubahan adalah adanya keengganan dari para pelaku pendidikan untuk introspeksi dan berbenah diri guna menyesuaikan diri dengan tuntutan lingkungan mengajar-mengajar dunia pendidikan dewasa ini. Sikap enggan tersebut biasanya didasari karena perasaan takut akan ketidakjelasan hasil yang akan diperoleh jika perubahan dilakukan, atau merasa malu karena tidak mampu untuk menggunakan TIK, atau disebabkan tidak adanya motivasi yang cukup besar untuk menggerakkan seluruh jiwa dan raga dalam menjalankan berbagai perubahan yang dibutuhkan, dan beberapa alasan klasik lainnya. Dimana posisi TIK dalam perspektif ini? Berdasarkan pengalaman-pengalaman sebelumnya, keengganan dan ketiadaan motivasi tersebut lebih disebabkan karena kesalahpahaman atau kesalahpersepsian mengenai keberadaan dan kehadiran TIK di institusi pendidikan. Sekali lagi ditekankan bahwa TIK menemui konteksnya untuk mengatasi keterbatasan candra indera manusia, bukan untuk menggantikannya. Demikian pula halnya dengan proses belajar mengajar dan keberadaan guru/dosen yang dalam perspektif tertentu tidak akan pernah tergantikan peranannya. Untuk itulah dalam tahapan penerapan awalnya, fasilitas atau fitur TIK yang dikembangkan untuk diterapkan haruslah yang bersifat menunjang kinerja peran pendidik di tempat yang bersangkutan bekerja. Di sinilah keunikannya TIK karena dapat diterapkan secara modular, dalam kerangka kustomisasi, sesuai dengan kebutuhan dan karakteristik penggunanya sehingga terasa jauh lebih personal, jauh dari kesan adanya pemaksaan secara sepihak untuk melakukan perubahan secara kaku.

5 Strategi Menghadapi Tantangan Penerapan TIK

5.1 Penyediaan Infrastruktur dan Fasilitas TIK

Setelah komponen manusia dan proses berhasil ditangani – yang sebenarnya merupakan bagian yang tersulit dalam mengelola perubahan – maka hal terakhir yang harus dipikirkan adalah bagaimana dengan segala keterbatasan yang ada dapat disediakan infrastruktur dan fasilitas TIK yang memadai. Untuk institusi pendidikan yang memiliki modal finansial yang kuat, tentu saja hal ini tidaklah menjadi masalah. Namun bagaimana dengan sekolah-sekolah dan kampus-kampus kecil di daerah terpencil yang notabene merupakan mayoritas dari populasi institusi pendidikan di Indonesia? Kuncinya hanya satu, yaitu motivasi dan keinginan untuk terjalinnya kerjasama antara sesama institusi pendidikan, dan dengan pihak swasta, komunitas, maupun pemerintah sebagai perumus kebijakan pendidikan nasional. Agar semangat bekerjasama ini

terwujud, harus ada perubahan pola pikir yang ditanamkan terutama kepada para pemilik dan pengelola lembaga pendidikan khususnya yang telah mendapatkan predikat unggul. Prinsip yang perlu ditanamkan dan dipahami adalah:

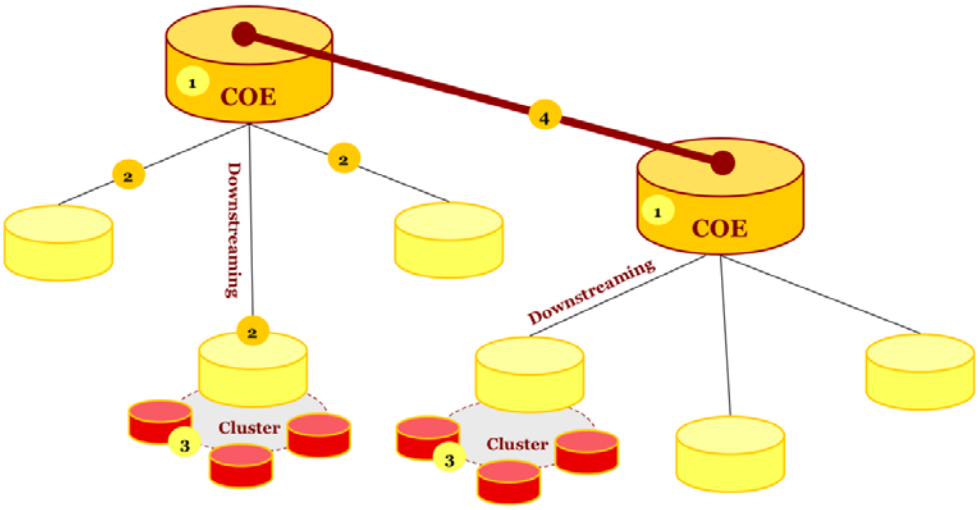
- Nilai sebuah jejaring komputer meningkat secara kuadratik sejalan dengan semakin banyaknya titik-titik yang dihubungkan dengannya (baca: Hukum Metclafe). Artinya adalah cara mengakumulasikan ilmu pengetahuan yang termudah dan termurah adalah dengan menghubungkan komputer atau jaringan komputer dengan titik-titik komputer dan/atau jaringan lainnya. Dengan demikian, sebuah sekolah atau kampus yang memiliki referensi pendidikan yang disimpan di satu komputer atau jaringan komputer, dapat meningkatkan repositori referensi dan ilmu pengetahuan yang dikandungnya dengan cara menjalin hubungan dengan institusi lain yang memiliki komputer atau jaringan serupa. Internet merupakan bukti dari kebenaran prinsip ini.
- Dalam era globalisasi yang ditandai dengan tingginya persaingan antar negara, perlu diterapkan strategi “coopetition” untuk memenangkan lomba ini, yaitu semangat untuk melakukan “collaboration to compete”. Sudah waktunya berbagai lembaga pendidikan – di tengah-tengah kompetisi antar mereka - melakukan kolaborasi untuk meningkatkan daya saing pada level yang lebih tinggi, yaitu regional atau internasional. Tanpa adanya ini, maka masing-masing institusi akan mengalami kesulitan bertahan dalam waktu yang lama akibat sedemikian ketatnya situasi persaingan global dewasa ini.
- Perlu diingat pula bahwa dengan adanya kerjasama antar lembaga pendidikan, maka akan tercipta frekuensi dan volume interaksi maupun transaksi yang tinggi di industri pendidikan Indonesia. Semakin tinggi frekuensi dan volume interaksi akan meningkatkan “bargaining position” antara industri pendidikan dengan sektor swasta karena adanya “economy of scale” yang tidak dapat diingkari. Hal ini berarti bahwa akan semakin banyak tercipta produk-produk dan jasa-jasa khusus bagi dunia pendidikan yang jauh lebih terjangkau secara biaya, jauh lebih cepat dari segi akses pelayanan, dan jauh lebih baik dari segi kualitas produk/jasa. Hanya dengan kebersamaan inilah maka keluhan terhadap mahalnya TIK untuk pendidikan dapat ditekan serendah mungkin biayanya.

5.2 Akselerasi Penerapan TIK di Tanah Air

Pertanyaan berikutnya adalah, jika secara mikro telah terdapat sejumlah institusi pendidikan di tanah air yang TIK-nya telah maju dan bersedia untuk melakukan kerjasama dalam format “shared services” dan “shared resources”, maka langkah apa yang harus dilakukan untuk mempercepat akselerasi adopsi TIK secara makro atau nasional? Bagi negara sebesar Indonesia, isu yang selalu mengemuka adalah masalah “scalability” dan “sustainability”. Bagaimana agar inisiatif pengembangan TIK ini dapat diduplikasikan dan direplikasikan secara cepat ke seluruh tanah air? Bagaimana agar masing-masing institusi pendidikan dapat memelihara TIK yang dimilikinya selama

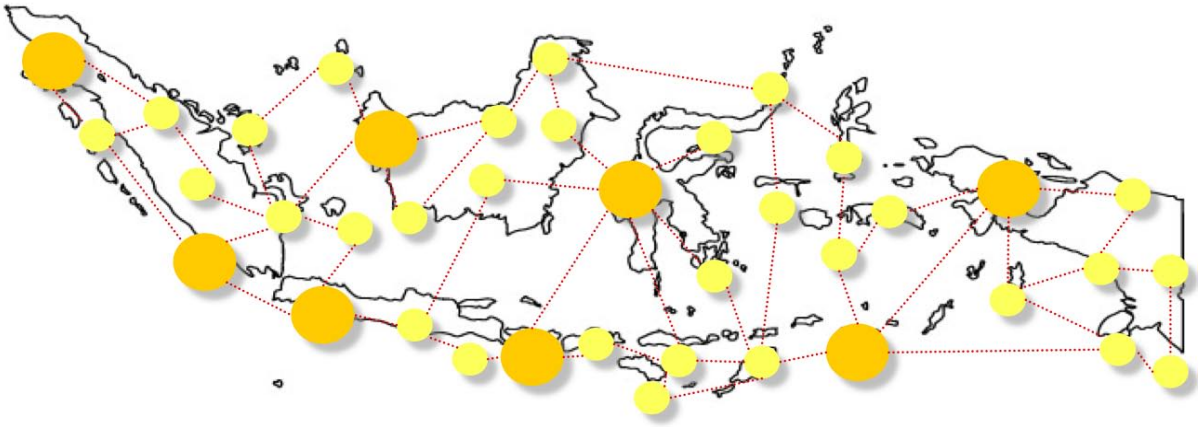
terus-menerus dan berkesinambungan? Secara konseptual, ada 3 (tiga) langkah yang dapat dilakukan seperti yang dijelaskan berikut ini.

Langkah pertama adalah dengan menggunakan model “multi level marketing”. Sekolah-sekolah atau kampus-kampus yang telah memiliki TIK canggih, baik yang dibangun sendiri maupun yang dibantu dengan dana dari pemerintah atau hibah luar negeri, membuka dirinya untuk dapat disambungkan ke institusi pendidikan mana saya yang tertarik – baik yang secara fisik berdekatan, maupun yang secara logis memiliki visi dan misi yang selaras. Jika hal ini dilakukan sampai level dua, maka dalam waktu cepat akan terdapat sejumlah komunitas sekolah dan/atau kampus yang memiliki fitur kapabilitas relatif sama dalam bidang aplikasi TIK.



Dalam model ini, institusi pendidikan unggulan menjadi node utama yang berfungsi sebagai Center Of Excellence (COE) dari komunitas “downstreamnya”. Artinya adalah, yang bersangkutan akan menjadi pemimpin atau kepala suku implementasi TIK di komunitas lembaga-lembaga yang ada di bawahnya.

Langkah Kedua yang perlu dilakukan adalah dengan menghubungkan keseluruhan node-node atau COE-COE yang tersebar di seluruh Indonesia. Jika langkah ini dilaksanakan, maka mendadak seluruh institusi pendidikan di Indonesia telah terhubung secara virtual, sehingga trafik interaksi antar lembaga-lembaga pendidikan dapat meningkat secara signifikan. Pada saat inilah maka nilai atau manfaat tertinggi implementasi TIK bagi dunia pendidikan nasional akan terasa. Kedua langkah ini secara langsung menjawan isu “scalability” yang dimaksud.



Langkah terakhir merupakan strategi untuk menjawab tantangan atau isu "sustainability". Setelah memiliki trafik yang tinggi, akibat banyaknya interaksi dan transaksi antar institusi pendidikan, maka tibalah dilakukan inisiatif kerjasama dengan pihak lain dalam kerangka PPP (Public Private Partnerships). Melalui kerangka PPP ini, bertemu tiga pihak besar yaitu Akademisi, Bisnis, dan Government (baca: ABG). Mereka saling menjalin kesepakatan tertentu, yang tentu saja saling mendatangkan manfaat bagi masing-masing pihak, untuk membangun sebuah inisiatif berskala nasional untuk meningkatkan daya saing. Dalam konteks ini, misalnya kerjasama yang bisa dibangun untuk menjamin adanya keberlangsungan pengembangan sistem adalah sebagai berikut:

1. Pihak swasta bekerjasama dengan pemerintah membangun infrastruktur dan fasilitas TIK yang khusus bagi institusi pendidikan di Indonesia dengan melakukan investasi bersama;
2. Setiap COE dengan kelompok komunitas pendidikan yang telah terbentuk tadi urunan untuk membeli dan membayar produk/jasa yang tersedia berbasis pemakaian (misalya: per transaksi atau per interaksi atau per bulan) dengan harga yang relatif murah sekali karena adanya "economy of scale" yang dijelaskan sebelumnya;
3. Keseluruhan pembayaran dari sentra-sentra COE ini akan dipergunakan untuk membiayai operasional infrastruktur dan fasilitas serta guna mengembalikan modal investasi yang telah dikeluarkan sebelumnya, disamping tentu saja untuk meningkatkan kinerja dan mengembangkan teknologi terkait;
4. Trafik interaksi yang tinggi akan mendatangkan transaksi bisnis di antara pihak swasta dan institusi pendidikan, yang pajaknya akan menjadi pemasukan pemerintah untuk selanjutnya diinvestasikan kembali di sektor pendidikan.

Melalui mekanisme di atas diharapkan dapat terjadi akselerasi atau percepatan adopsi TIK di dunia pendidikan di tanah air.

6 Penutup

seperti teknologi lainnya, selain mendatangkan manfaat yang besar, TIK juga memiliki potensi ancaman yang cukup berbahaya jika tidak dikelola secara sungguh-sungguh. Isu-isu seputar pornografi, kejahatan maya, penipuan bisnis, kebohongan publik, dan lain-lain hanyalah merupakan sebagian efek negatif yang mengancam komunitas pendidikan sewaktu-waktu. Oleh karena itulah maka perlu ditanamkan perilaku "self censorship" terhadap setiap insan pendidikan agar tidak terpengaruh dengan godaan tersebut.

Dalam sebuah kesempatan tokoh pendidikan almarhum J. Drost mengatakan:

> *"Teknologi ini bersifat netral, karena hanya merupakan alat, piranti dan sarana untuk pembelajaran dan melayani masyarakat. Yang berbahaya bukan teknologi, tetapi mental mereka yang takut akan teknologi atau keranjingan teknologi…"*

Artinya jelas bahwa biarkan teknologi pendidikan seperti TIK menemukan posisi dan peranan sesuai dengan karakteristiknya. Kehadiran TIK di dunia pendidikan sekali lagi bukan untuk menggantikan berbagai infrastruktur dan suprastruktur mengajar-belajar yang sudah ada, melainkan untuk menjadi komplemen dalam rangka "to meet the unmet educational needs…"

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STUDENT OWNERSHIP OF LEARNING IN VOCATIONAL EDUCATION: CREATING DIFFERENTIAL LEARNING ENVIRONMENTS THROUGH TECHNOLOGY INNOVATIONS

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Abstract

Learning in the 21st Century can no longer be restricted to classroom teacher-student model. The teacher has to adopt a coach or facilitator role to guide the student in the elicitation of knowledge from information. This model of student ownership of learning opens new possibilities to the transformation of the teaching and learning process. The 21st Century also presented to the teaching community many learning technology tools which can be integrated to create an inclusive interactive learning environment. The benefits of such environments would be more profound if the different learning abilities of the students are also considered through a respective transformation in the teaching pedagogy. In this paper, a rationale, framework and examples of student ownership in learning are presented.

Keywords: Dynamic Teaching Ratio, GREAT Pedagogy, Authentic Learning, Web 2.0

Introduction

During the past four years, the School of Electronics and Info-Comm Technology has been test-bedding several new concepts for bringing instructional innovation and technology into the classroom in specific to address the different learning abilities and styles of students. The culmination of these efforts resulted in the advent of the Dynamic Teaching Ratio ('DTR') addressing differential learning abilities of students with favourable results. This paper presents another development which focuses on the next component to enrich differential learning, i.e., student interactive learning and authentic learning styles. This interactive pedagogy laid its foundation on the framework of **G**roup Learning, **R**eflection, **E**xperimenting, **A**uthentication and **T**rial ('GREAT'). The GREAT pedagogy is designed to increase the students' attentiveness, aid in individual knowledge discovery, increase retention of key learning points and knowledge application performance level.

Theoretical Framework

The GREAT pedagogy aims to equip students with important skill sets and knowledge for life and the workplace. The resulting pedagogy encourages lecturers to deliver curriculum in innovative ways outside of classroom setting, and promotes learner

interests by creating ownership in their learning journey. It encourages students to take more active roles in their own learning. The pedagogy also seeks to increase student activity in the traditional classroom environment. It seeks to have the following outcomes; lower attrition and higher student success rate; produce confident, motivated and responsible graduates; and better prepared graduates for success in employment.

Current Training Environment

In the traditional classroom learning, student learning responses are managed through the mode of delivery, i.e., either as lecturing or facilitating style, time spent in class by and between lecturer and students, the level of interactivity, the level of students' attentiveness and apparent interest, the nature of students' questions and the effectiveness of the learning aids. Typically in this environment, there exist four major categories of classroom activities:

a. Telling

Teacher communicated through a combination of verbal and visual representations underlying concepts and key learning points;

b. Sharing

Mixture of structural or ad hoc discussion by and between the teacher and student on the topic content and context geared toward the objective of interpreting, re-enforcing and enriching the comprehension;

c. Attention Management

In this activity, attention management is anchored by the delivery style by which lecture style used time more effectively in terms of covering required material and learning points in the allotted time, whilst facilitation style tended to require more time but appeared to sustain the students' interest and attentiveness;

d. Response

Teacher generates questions to reinforce the clarity of the content and to resolve misinterpretation over context. This activity also provides an indicator to the level of understanding by the students.

Architecture of GREAT pedagogy

The architecture of pedagogy consists of 5 learning phases: namely **G**roup Learning, **R**eflection, **E**xperimenting, **A**uthentication and **T**rial as shown below in figure 1;

Figure 1 The GREAT Pedagogy Model.

Group learning refers to classroom information dissemination and the creation of a student individual Employment Portfolio ('EP', see Figure 2). EP provides entry point into the student training life cycle in ITE. Firstly, it is an online platform for ongoing students and graduates to update and access their resume, interests, project-portfolio, and social development (Co-Curricular Activities, Community Involvement Programme, Global Education Programme, Competition and Global Education Programme) information anytime, anywhere. This is to provide a continuum in the student capability growth repository made available to possible public or peer collaborative work development as well as a candidate review source for future employer.

Figure 2 Screen shot of an Employment Portfolio (EP)

Reflection involves ***learning to do*** with students participating in more functional practices. In this stage, the model draws on the theory of differential learning and caters to the different learning pace and learning needs of students. Learning is structured and different learning approaches are provided to different groups of students based on student's learning ability. The Dynamic Teaching Ratio Pedagogic Model, see Figure 3 has been adopted by all the 2010 intake classes in the School of Electronics & Info-Comm Technology at ITE College East since Jan 2010 as part of the ITE Innovate (2010-2014) in Intensifying Innovations in Teaching and Learning.

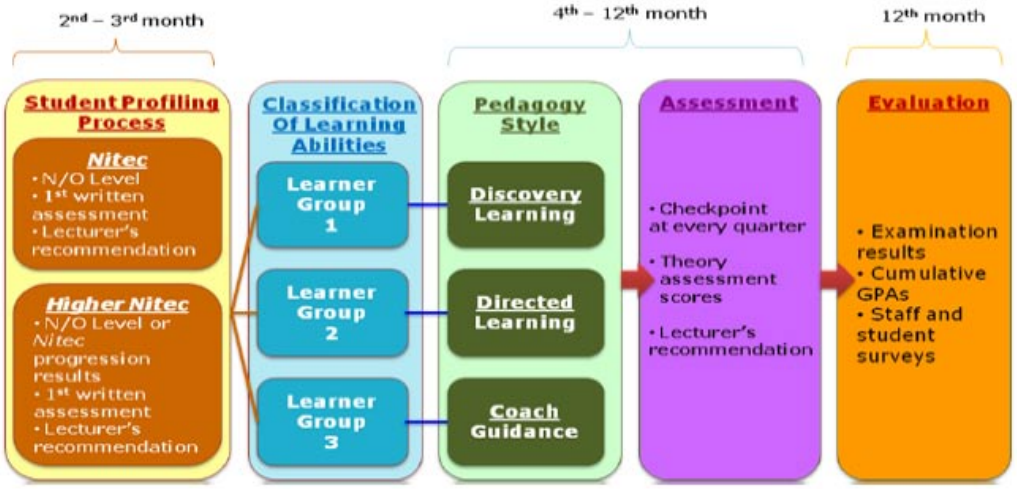

Figure 3 Implementation Framework of DTR model

Experimenting stage is another aspect involving ***learning to do*** with students participating in more functional practices. This is where students will be doing their Final Year Projects (FYP), industry projects, competitions and programme. Students would have learned to manage a project or assignments, which is a substantial piece of work and have the opportunity to use their intellectual abilities to the fullest. Such

knowledge and skills that students had picked up include the techniques associated with writing a good report, a skill that would be particularly useful in their future work.

The **A**uthentication stage draws reference to the authentic learning which involves ***learning to be*** full-pledged practitioners by assuming professional roles within the community. For these reasons, it follows that students would need an opportunity to obtain employability skills and competencies while still in school, under a supervised environment to assist them in their future employment efforts. Students need to be conditioned for the working industry by exposing them with authentic learning and going through real working environments.

The School of EIT (SEIT) has setting up of service support centers within the School, See Figure 4. There will be four support centers to cater to students in different courses within the SEIT. Students will be attached on different schedules to perform work activities.

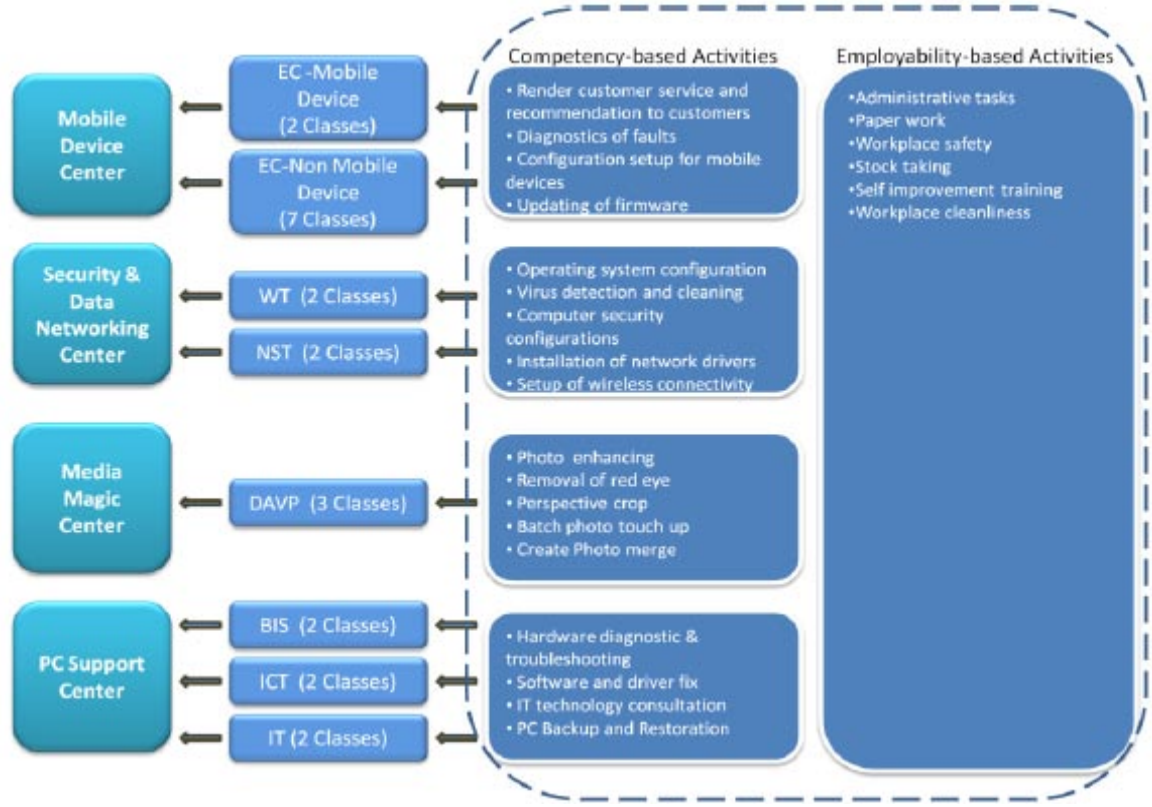

Figure 4 Support Centres for Authentic Learning

The aim of the Student Service Support Centers is to provide students with authentic working opportunities to develop their employability skills and competencies. The support centers provide properly planned activities which will expose students to the professional culture and workplace practices. These **employment conditioning** ensures an easier transition from study to employment, as well as develops knowledge, skills, and attributes that are difficult to foster with academic studies alone. Each support centre will provide various employability and competency based activities created jointly by the module lecturers and center supervisors for the students to perform.

In the **T**rial stage, students will be involved in project presentation as a member. Students will be taught/learn how to creatively critique each other's work. Critiques help students hone their persuasive oral and writing, information-gathering, and strengthen their knowledge on the subject matters.

Guidelines to The Design of The Great Pedagogy Training Environment

In the design of the GREAT pedagogy Training Environment, the heart of the concept is in providing meaningful interaction, for the purpose of learning. It requires selecting activities that allow learners to practice doing what knowledgeable and experienced people DO with the content (in order to gain expertise and mastery — over time). Too many online instructional materials contain limited or the wrong types of activities, though. Most of the time when we design instruction, we need learners to be able to use the content, not just recall it. If we truly want learners to be able to use the content, we need to design instructional activities that involve learners in the types of activities that allow them to practice using the content as it is used in real-life situations, deal with increasingly complex uses of the content as a whole (not just the parts), and get meaningful feedback and necessary support along the way. This will address the different learning abilities of the students hence encouraging them to take on their ownership of learning. The GREAT pedagogy in the classroom concept brings in the modification in classroom activities and incorporates the following five goals and its respective activity to support the students' ownership learning journey:

e. Enlargement of Student Activity

Stimulate the active processing of data, information, ideas, viewpoints and beliefs at the same time as the learning is taking place. The opportunity for participation and contribution should be available equally to all students. The students are given research assignment prior to a lesson by which student(s) will be selected randomly to present his or her understanding of content information. The tool in question would be through the Internetresources or prior reading through the School Online Learning Repository System based on Modular Object-Oriented Dynamic Learning Environment ('MOODLE'). Information ascertained will then be uploaded into their respective Employment Profile online for subsequent referral;

f. Communication

Create an environment in the classroom where differences in answers and opinions as a group can be observed and discussed immediately upon tabulation while keeping each student's specific response anonymous.

Incorporate an e-white board platform (e.g., MOODLE) system whereby students can feedback their response anonymously to questions by the teacher through network devices such as PC and UMPC. The teacher can then carry out bi-direction conversation with the class to comprehend the topic;

g. Learning Desire and Commitment

Provide students with frequent indicators of both individual and class learning progress which include comparisons within peer groups to encourage positive effects of self-assessment and competition among students.

Students are selected to video-record peers activity during practical session and then video-playback cross comments on areas of errors and suggestion on areas of improvement;

h. Performance Level Evaluation

Provide the means for pre-planned questioning to evaluate the performance level of topic understanding

At the end of the lesson, students will log on to a question page by which responses will be recorded against the student name for the teacher to evaluate the performance level and subsequently focus on the learning concerns of individual question;

i. Personal Development Ownership

Provide the means for which the student will be able to collect information on their own development progress, thus motivating student towards Page | 8

learning excellence. All students will start his or her learning journey with the School with the setup of an Employment Portfolio online. The student will update his or her academic and social achievement and progression on this Portfolio. It also provides a platform of providing information access to teachers when sourcing for student to participate and recommend to activities. This Portfolio will also be promoted to future employers as a means to increase the visibility of ITE graduates.

Conclusion

In preparing students to be industry worthy employee, there have been many pedagogic approaches and learning environment designed to expose the student to problem solving, experientially learning, and authentic learning. Tools have also advent through the various innovations presence in information technology. In many learning environments, the integration of the cognitive driven pedagogies and Information technology tools has resulted in enhancement in the way students learn. However, many a times, these approaches do not consider the different learning abilities of the students in the classroom with regard to staging the learning process. This paper describes the research and development activities done in the School of Electronics and Info-Comm Technology (‘SEIT’) in the Institute of Technical Education (‘ITE’) in Singapore in addressing the different learning abilities of its students for both classroom and laboratories environment coupled with information technology enabled tools. Specifically, the application of the GREAT (**G**roup Learning, **R**eflection, **E**xperimenting, **A**uthentication and **T**rial) pedagogy is presented to strengthen the student ownership of learning along with the recommendations towards the rethinking of learning environments design.

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WEB-BASED PHYSICS LEARNING TECHNOLOGY TO IMPROVE EFFICIENCY OF TEACHING AND ACADEMIC COMPETENCE OF STUDENTS AT THE ELECTRICAL ENGINEERING DEPARTMENT, FACULTY OF ENGINEERING, JAKARTA STATE UNIVERSITY

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Abstract

This research aims to (1) create a web-based physics learning technology, (2) know the effect of web-based learning system to improve the efficiency of physics teaching, and (3) know the difference between web-based learning systems and classical lecture system in improving students' academic competence. From the design of web-based physics learning system conducted research using experimental methods, in which respondents were students participating in subjects Physics (51150793) semester 092, academic year 2009/2010 at the Department of Electrical Engineering. Samples of 80 randomly selected and divided into two groups. Data analysis techniques using test equality of two average with t-test for the level of significance $\alpha = 0.05$. Based on the calculation and analysis of data obtained an average score of physics academic competence with a web-based learning system is 72.0 while the classical lecture system is 67.5. Concluded that teaching efficiency is measured from the level of understanding of physics through a web-based learning system is higher than a classical lecture system. With t-test results obtained t count (= 2.40) > t table (= 1.65) so that H_0 is rejected, and concluded that the physics competence with a web-based learning system is higher than a classical lecture system.

Keywords: web-based physics learning, the efficiency of physics teaching, students' academic competence

A. INTRODUCTION

Physics as a basics science is very important for the students of the Faculty of Engineering, because a foundation in understanding the engineering sciences. By understanding the physics of matter, students are expected to understand the laws of physics, applied physics in technology, and develop skills in areas of special expertise

[1]. The result of self-evaluation at the Department of Electrical Engineering [2], some weaknesses in the implementation of physics courses including: (1). low input students' academic ability, (2). the large number of students in college, about 80-90 participants per semester, (3). the narrowness of the lecture hall to accommodate the number of students, (4). low English proficiency students, (5). high lecturer workload, (6). low student final exam scores, (7). low completion rates of students; (8). length of study for students of physics is a prerequisite course to attend the next course; finally (9). length of time the completion of thesis to be more. These issues require solutions so students can learn in comfort and fun in a conducive academic atmosphere so as to achieve optimal performance.

To help students understand the physics needed learning innovation to improve their achievement. As the rapid development of information and communication technology, the use of web-based learning technology is one of the best innovations in improving the effectiveness of teaching and enhance student learning outcomes of competence in subjects of Physics. The research problems can be formulated as follows: (1). how to create web-based physics learning system, (2). how the influence of web-based learning system to improve the effectiveness of physics teaching, (3). how the difference between a web-based learning system with a classical lecture system in improving student learning outcomes of competence in subjects of Physics.

B. CONCEPT DEVELOPMENT AND THEORITICAL REVIEW

1. The concept of Web-Based Learning

Academic atmosphere to promote the establishment of four pillars of competence, as suggested by UNESCO namely: learning to know, learning to do, learning to be, and learning to live together can be done with scientific and technology approach [3]. Selection of appropriate learning media determine the efficiency of teaching as presented by the VR Randall following: *"If you talk with teachers and observe what they do in the classroom, you will find that some are very effective in their use of lectures, while others like to use discussion [or Socratic method] ……. However, to be an effective teacher you should not focus on any one method to the exclusion or minimization of the others"* [4]. Given the teaching and learning activities in the future will be dominated by the role of lecturer, references, and technology, then one of the most appropriate learning media to enhance students' competence is a web-based learning system.

Web-based learning technology is defined as: *technology based web-learning is a generic term for all technologically supported learning using an array of teaching and*

learning tools as e-mail, internet and computer networks aided instruction also commonly referred to as online course [5]. Some of the excess use of web-based learning technology in the field of education [6,7,8] are: (1). availability of e-moderating facilities, (2). lecturers and students to discuss and use the lecture materials are structured and scheduled via the Internet, (3). students can learn anywhere and anytime, and (4). students become active Learners.

2. Teaching Efficiency

Teaching efficiency is the ratio between learning results achieved (outputs and outcomes) with all inputs [9]. Indicators of teaching efficiency in web-based learning system include: (1). teaching materials documented in the computer so it can be easily accessed and studied by students, (2). efficiency of time both by lecturers and students in teaching and learning process, (3). efficiency of learning because students can learn anytime and anywhere; (4). learning strategy where students can study independently of teaching materials available in the computer, (5). teaching and learning activities can be more fun and not boring; (6). teaching and learning process can be more creative and innovative; (7). increase the level of knowledge and understanding of students as measured by the final value obtained from this course, and (8). improve the competence and shorten the period of study students.

3. Student Learning Competencies

Competence is the ability to perform activities in the work according to the standards expected. In relation to teaching and learning physics course, students are encouraged to enhance their learning competence in accordance with the standard of competence expected. Physics course (51150793) competency standards is to apply the concept of electricity and magnetism in a variety of problem solving and various technology products. Basic competencies of this course are: (1). apply the basic concepts of electric force, electric field, Gauss' law, and determine the electric potential at a point, (2). formulate the concept of potential and electric potential energy, (3). formulate and apply the working principle of the capacitor, (4). formulate an electric current in a series of direct current, (5). applied magnetic induction and magnetic force on some technology products; (6). formulate the concept of magnetic induction, and (7). formulate an alternating current and its application in everyday life.

C. METHODS AND IMPLEMENTATION STRATEGY

1. Matter Physics in Learning Web

Physics course (51150793) has a weight of 2 credits, held as many as 16 times meeting with the theory of face time 100 minutes respectively. After participating in the learning process students are expected to increase competency: (1). explains the basic concepts of electric magnets to study physics further, and (2). apply these concepts to solve basic problems of physics as a major cornerstone in the study of engineering sciences. Model design of a web-based physics learning as shown in Figure 1 below.

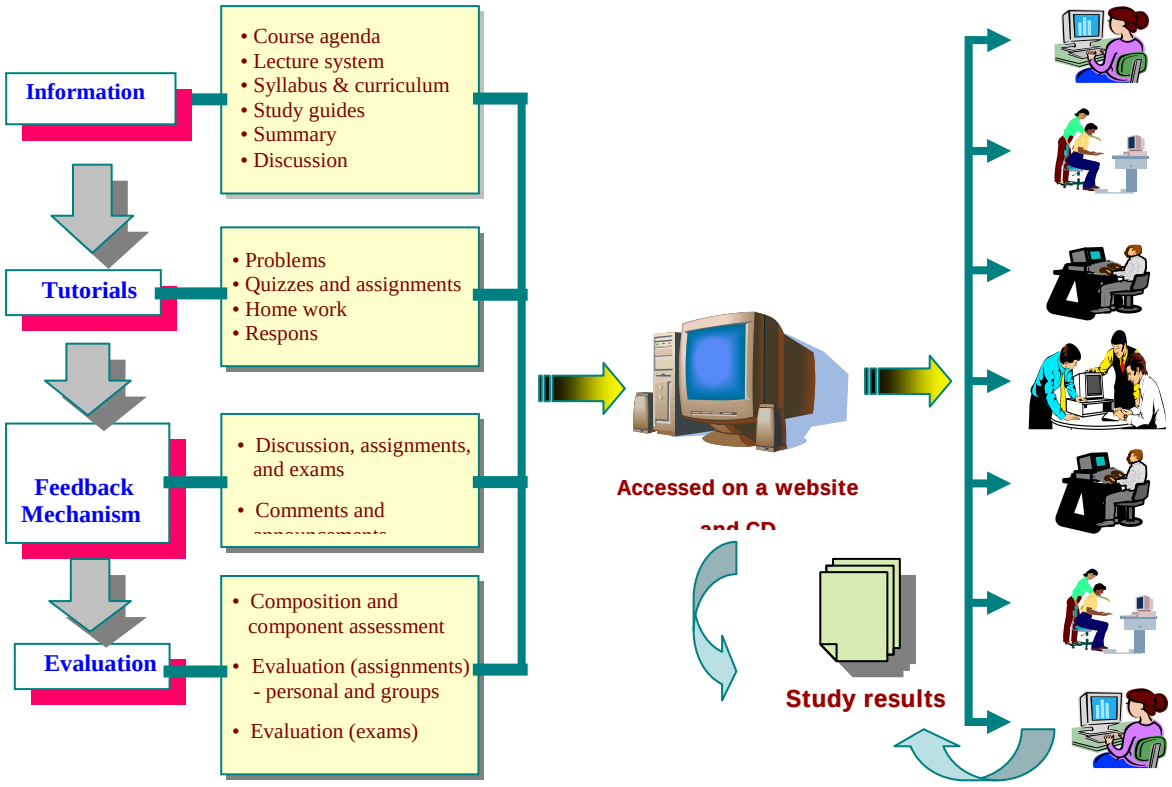

Figure 1: Design of Web-Based Physics Learning System

2. Making of Web-Based Learning Technology

The main obstacle web-based learning process is the lack of interactivity between lecturers and students. However, the internet media is very possible to make interactions in real time or not. It's just the learning process in real time requires a very large fund. For this reason, web-based physics learning technology that will be created using a form not real time or asynchronous.

Four stages of site development, namely: (1). analysis stage, to determine the list of site functions, (2). design stage, to produce the draft list of sites based on the function of the stages of analysis, (3). implementation stage, to develop the web pages, coding, and implementation of a database, and (4). development stage is testing a list of functions to ensure that all functions have been going well.

3. Performance Indicators of Success

Performance indicators used to measure the success of innovation with a web-based technology is done by comparing the competence of learning outcomes using a web-based learning system with classical lecture system. With this learning technology is assumed that the academic achievement of students who achieved using web-based learning system is higher than the classical lecture system.

a. Hypothesis

H_0: there is no difference between the competence of learning in physics courses that use web-based learning system with the competence to learn that using the system in a classical lecture. H_1: there is a difference between the competence learning in physics courses that use web-based learning system with the competence to learn that using the system in a classical lecture.

b. Population and Sample

The population of this study are students Electrical Engineering Department, Faculty of Engineering, UNJ, participants of physics course (51150793) semester 092 academic year 2009/2010. Technique of sampling using simple random sampling. The number of samples of 80 respondents who were randomly selected and divided into two groups, namely the experimental group who use the web-based learning system and the control group using a system of classical lectures.

c. Instrument

The research instrument is the result of learning physics course, used to measure students' learning competencies in aspects of knowledge, comprehension, application,

and analysis. The validity of instrument describes an instrument for measuring the level of results that would be expected, calculated using the Point Biserial formula [10]. Reliability that provides a description of the level of trust an instrument as collecting data, calculated with the Kuder Richardson formula (KR-20).

d. Test Requirements Analysis

Data were analyzed using homogeneity tests and normality test. Test of homogeneity using the variance two common test to see if the data compared to homogeneous. Tests of normality performed with Liliefors to test determine whether the data were normally distributed [11].

e. Technique of Data Analysis

To test the hypothesis whether there is a difference between competence learning in physics courses that use web-based learning system with classical lecture system used t-test.

D. IMPLEMENTATION RESULTS AND DISCUSSION

1. Results Design of Physics Learning Site

The design of a web-based physics learning system can be accessed via the internet with address: www.unj.ac.id/ft/electro/nanang_elka. Some examples of site design as shown in Figure 2 and Figure 3 below.

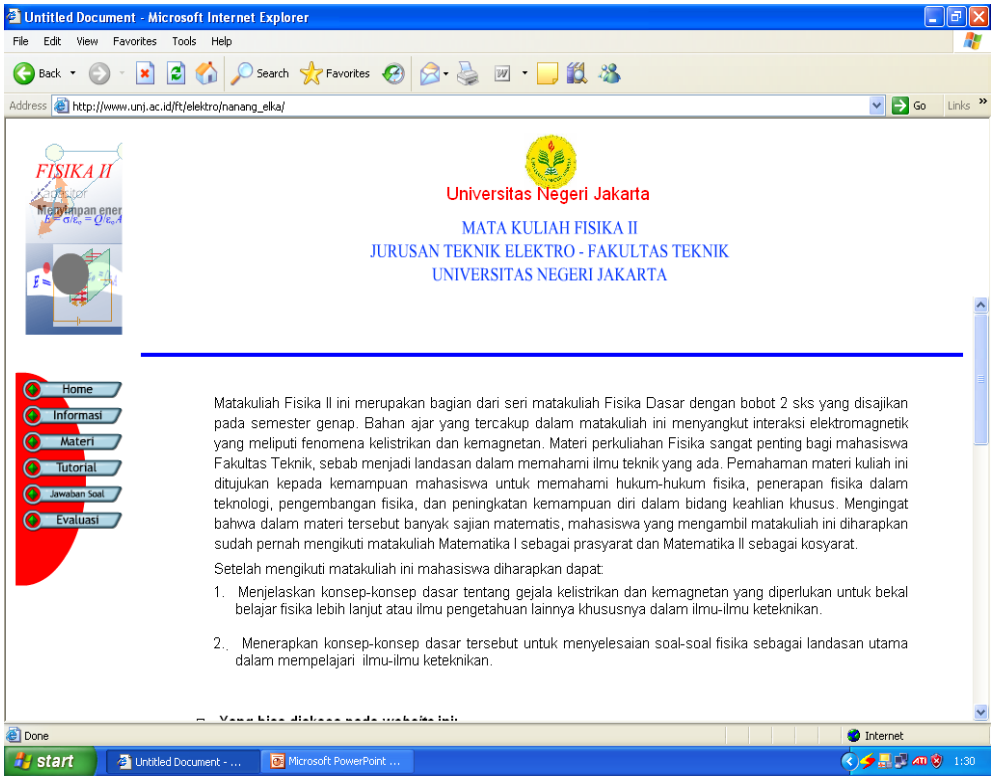

Figure 2: Main Display of Physics Learning Site

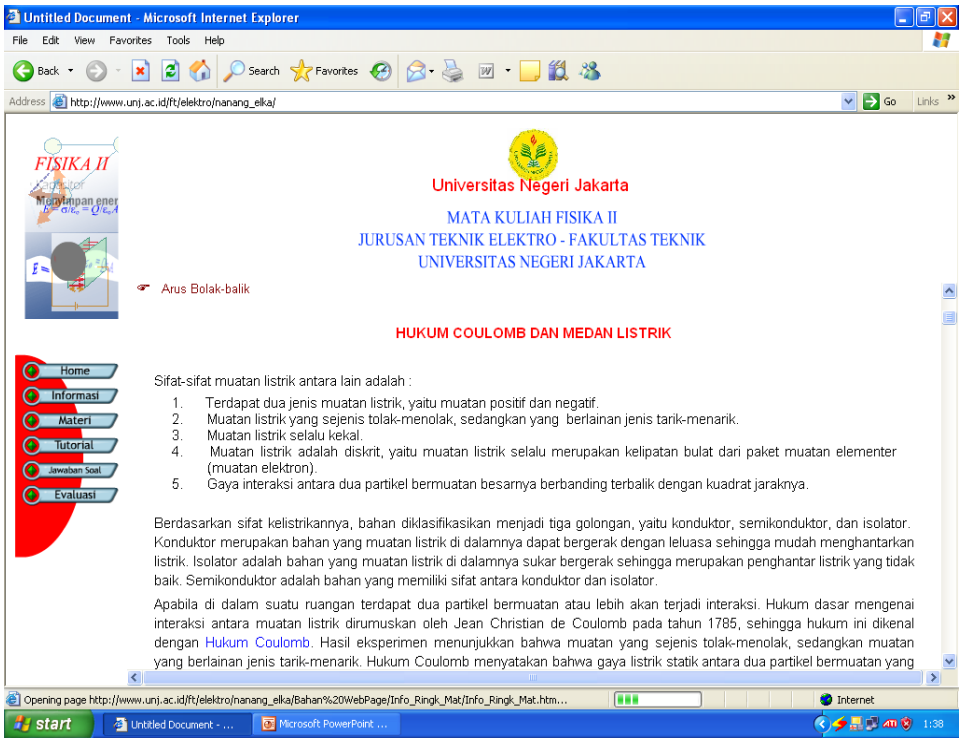

Figure 3: Matter Display of Physics Learning Site

2. Data Description of Physics Learning Competency

Based on calculations, the following data give an description about the competence learning in physics courses with a web-based learning system and classical lectures system.

Table 1: Summary of Data Description

Variable	Respondents	Mean	Median	Modus	Deviation
Web-based system	40	72,0	70,6	72,0	0,84
Classical system	40	67,5	68,8	68,3	0,44

From Table 1 above can be seen that the average score of competency learning in physics courses using a web-based learning system is 72,0 while the average score of competency learning with a classical lecture system is 67,5. It can be concluded that the efficiency of teaching as measured from the level of student understanding of the physics course through web-based learning system is higher than the classical lecture system.

3. Testing Requirements Analysis

To obtain the requirements analysis, data were tested using homogeneity tests and normality test.

a. Homogeneity Test

Results of homogeneity test with significance level $\alpha = 0.05$ as apparent in Table 2 below.

Table 2: Results of Homogeneity Test

Value Varian Sample	Variable: The difference of physics learning competency		F count	F table
	Web-based system	Classical system		
σ^2	0,709	0,439	1,61	1,70
n	40	40		

Indicated that F count (= 1.61) < F table (= 1.70) so that it can be concluded that both the data variance is homogeneous.

b. Normality Test

Normality test carried out both for data from competency of physics learning with web-based learning system and classical learning system. The result of normality test with significance level $\alpha = 0.05$ as shown in Table 3 below.

Table 3: Results of Normality Test

Physics learning competency	L_0 count	L_0 table
Web-based system	0,138	0,140
Classical system	0,113	0,140

Because of the value of L_0 count (=0.138 and =0.113) < L_0 table (=0.140), the data population of normally distributed. Tests of homogeneity and normality showed that the research data had met the requirements for testing the hypothesis.

c. Hypothesis Testing

Hypothesis testing using t-test. The test results with significance level α=0.05 and degrees of freedom dk = 78 as shown in Table 4 below.

Table 4: Results of Hypothesis Testing

Calculation of value	t count	t table
Value	2,40	1,65

Indicated that the value of t count (=2.40) > t table (=1.65) means that the research hypothesis (H1) was accepted and the null hypothesis (H0) was rejected. Thus the results of this statistical test can be concluded that competence results of student learning using web-based learning system is higher than classical lecture system.

E. CONCLUSIONS AND SUGGESTIONS

1. Conclusions

Based on the results of research and discussion, it can be concluded that:

a. Web-based physics learning system was created through four stages, namely: analysis, design, implementation, and development. The design system produces six main pages: home, information, summary of lectures, tutorials, feedback mechanisms, and evaluation.
b. The average score of physics competency using a web-besed learning system is 72.0 while the average score of outcomes competency using a classical lecture system is 67.5. Thus concluded that the efficiency of teaching as measured from the level of student understanding of the physics course through web-based learning system is higher than classical lecture system. Increased competence score only 5% caused by low levels of literacy in the information technology of students participating in subjects physics.
c. Based on the analysis of research data using t-test obtained by value t count (= 2.40) > t table (= 1.65) so that H_0 is rejected, and concluded that the competence of physics with a web-based learning system is higher than a classical lecture system.

2. Suggestions

The use of web-based learning system requires a level of literacy in information technology is quite high. Therefore, the level of computer literacy and internet is a must-have basics in designing web-based learning system. Increasing of computer literacy and internet will help develop a web-based learning technology.

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APPLICATION FOR SUPPORTING STUDENTS IN LEARNING GRAVITATION, WORK AND ENERGY

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Abstract

Nowadays, it is undeniable that the use of ICT has spread in most of human's life aspects. One implication from the spread of technology is integrating it in teaching and learning process. There have been many applications created to help the teaching learning activities. One area that could be explored is the use of ICT in teaching learning process at high school level in various subjects. It is important to start integrating ICT in their learning. What needs to be noted here is that the advantage obtained in using ICT for those processes. As the fact found so far, students often find difficulty in learning gravitation, work, and energy. To start with, this study tries to design support tool which can be used for helping students in learning gravitation, work and energy in a more interesting way. It is expected that with the implementation of the application, it will increase students' motivation in learning the subject and help them to understand the concept in a much easier way. The application built using waterfall method by completing each stage in its process. It uses macromedia flash professional 8 to create the module and applies adobe Photoshop to make the application is more interesting to see. At the system integration and testing stage, it uses client black box testing to see whether or not the application can perform its task as it is designed. It turns out that the application does what it is supposed to perform when it is tested. This shows that the application is like the one that is expected to be. Finally, the designed application is proven to help the learning process. The students find that this application helps them in learning gravitation, work and energy as it is illustrated in an interesting way through the multimedia.

Keywords: Learning, Multimedia, Gravitation, Work and Energy

1. Introduction

One of the effects of Information Technology development and its use is the emerging demand at the user level as the manager as well as the information generator. The use of ICT in education has brought education into a more advance level. It can be seen from the fact that there are many

Information Technology-based learning media. IT has contributed chances to develop a fun and effective physics learning that could involve students actively.

In relation to physics learning at school, it is common that most students consider it is a difficult subject as it deals with many formulas. Seeing that phenomena then it is important for teachers to teach the subject interestingly at least change students' perception. It could be in form of giving illustration through simulation. It is quite an easy job to teach students about basic concept of physics to students in an interesting and easy to understand way using the available aids. However, when it comes to teaching topics in physics that could not be supported by the available aids then it would just rely on imagination. Of course it is difficult for the students to understand as they just get the theory and formulae without any real object related that they see. To realize the idea of addressing this difficulty then it is an advantageous if a learning tool could be created so that the physics teaching learning process would be benefited.

2. Review of Literature

Multimedia is combinations of digitally manipulated text, photographs, graphic art, sound, animation, and video elements. When we allow an end user – the viewer of a multimedia project – to control what and when the elements are delivered, it is interactive multimedia [1]. Recently, multimedia has grown a lot and been used for many aspects of life, not only for the sake of entertainment but also ranging from advertising, communication to education. One important element of multimedia is animation [2]. In teaching physics, though sometimes it has been explained clearly by the teacher, not all students find it easy to understand and digest all the information given. It is certainly affected by the ability of the students to absorb the knowledge and it varies from one to the other. Another factor contributing to this phenomenon is the boredom caused by the teaching method which students think not interesting [3].

One important factor affecting the success of learning is the planning of the lesson as well as the material development. Material development itself is an inseparable part of syllabus. Learning material is knowledge, skills and behaviour that students must achieve to fulfill the standard of competence. Whether or not an objective is achieved could be seen from the learning indicator. If students could meet the indicators set, it means that the teaching learning process along with the material included is successful. Therefore, it is important to bear in mind that the material given to the students should support the teaching learning process to reach its standard and basic competencies [2].

The use of multimedia in teaching learning processes could make the process itself more interesting and interactive. Besides, it could improve the learning quality and encourage positive behaviour for the students as they will have more interest on the study they have. It could be achieve by the use of the media in which there are many facilities available to support the process. Some instances are such as enlarging small object which is often invisible for naked eye such as bacteria, electron, etc. On the other hand, it could also minimize big objects that could not be presented in class such us elephant, house, mountain, etc. Apart from those advantages, multimedia is also useful in presenting complex processes such as how machine works, how sun rotates, etc. It could present dangerous objects to class in a safe way like the eruption of volcano, poison, etc [2].

Simulation is an imitation of state of affairs or processes. The action of doing a simulation generally represents the key characteristics or the behaviour of abstract or physical systems. In the implementation of this multimedia is not only present something to the students but also involving students to input what is needed to run the simulation. After that, the application will run the application based on what has been inputted [4].

There are three goals in using the computer in learning activity i.e. cognitive, psychomotor, and affective. From cognitive point of view, computer could be used for teaching rules concepts, processes and complex calculation. Computer could also be used for explaining the difficult concepts in simple way using animated audio and video so that it could be applied for autonomous learning. From the psychomotor view, the learning will be in a form of game and simulation. Some of programs that have been implemented is that plane landing simulation, simulation of battle of war, etc. Meanwhile from the affective side, program could be use to trigger the emotion/feeling of the user by presenting voice clips or pictures.

3. System Design

Waterfall Method

Waterfall method is often considered as classic cycle (1970s) and nowadays it is known as linear sequence. This method needs a systematic approach in developing the system starting from analysis, design, coding, testing, and maintenance. The steps could be seen in Figure 1 [5].

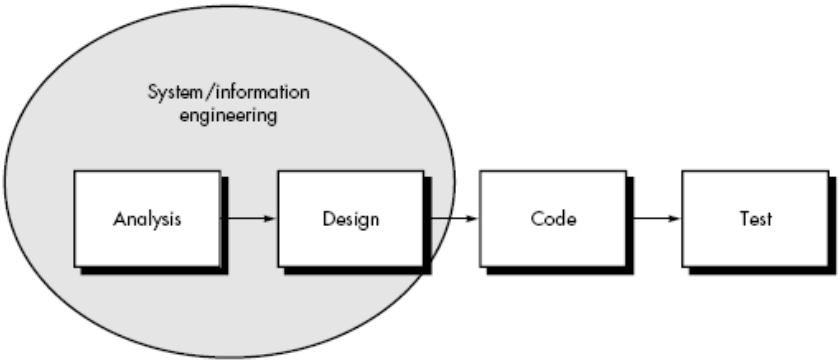

Figure 1: Stages in *Waterfall Model*

Modeling and Engineering System

At this stage, analysis and design are carried out to identify what kind of application it would be. This stage formulates the system that is going to be built. After that, this will do an analysis of the system which is related to process and all the data needed for this application.

Application Requirements Analysis

The data collection for developing this multimedia application is done through several ways. The first step is looking at the related literature. From the literature review done through books or journals then it will strengthen the theory applied in this application. Second step is documenting method in which all data and information needed are collected from the sources and most of them are related to the application which is going to be developed. The last step is by interviewing. The interview involves students who have less understanding of physics. This step

could identify the need of the students so that it will result the application needed to increase students understanding of the subject.

Software Requirement Analysis

In developing this system, it uses *Macromedia Flash Professional 8*, *Adobe Photoshop CS*. *Macromedia Flash Professional 8* is used to design the whole learning module including the text, pictures, animation and video. Meanwhile, *Adobe Photoshop CS* is used to smoothen the interface of the application

Hardware Requirement Analysis

In order to run this application, then it needs a kind of standard of specification. It means that this application will run on a certain standard. If it is not compatible then the application will not run as it is supposed to run. Even it could find difficulty if it does not comply with the specification decided. The standard of specification to run this application is Intel (R) Pentium (R), RAM 256 MB, Hard disk 80 GB.

Application Input Analysis

All the materials in this multimedia application are in accordance with the KTSP (Kurikulum Tingkat Satuan Pendidikan). The reason of having this curriculum is the fact that it complies with the existing curriculum. It is expected that it will functioned and used appropriate as it already integrates the existing curriculum.

Application Output Analysis.

When an application is designed then it will result a corresponding output. The output of the designed application would be an interactive multimedia application for physic learning, to be specific is about the concept of work, energy and gravitation.

Learning Method

The learning method implemented for this learning application is demonstration method. It is a teaching method which exhibits an object, event, rules, or sequence in doing something direct or indirectly using relevant learning media. The media used should be able to demonstrate concepts or any event [5]. The plus point of using demonstration method is that it helps students to understand more clearly about a process and facilitate the teacher in explaining. Apart from that, this method gives an advantage to the teachers, as they could direct students' attention to the ones that they want to focus on.

Research Method

This study uses action research method. It is important to note the cycle happens in class. It is the cycle which shows a process flow that comprises of planning, action, observation and reflection. The data collection is carried out by comparing the result of the test of the students using the application and those who do not use the multimedia application.

System Design

Data Flow Diagram (DFD) is a flow that represent the model of a system which consists of process, process flow, and entities related to the resulted Figure 1 is the context diagram from the

physic learning application.

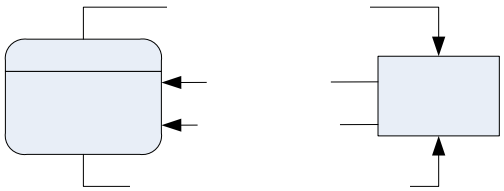

Figure 2: Context Diagram of Learning Application

In the diagram, it can be seen that there is one entity involved i.e. student. Student could see the topics; they are gravitation, work and energy. Then the application will display the chosen topic.

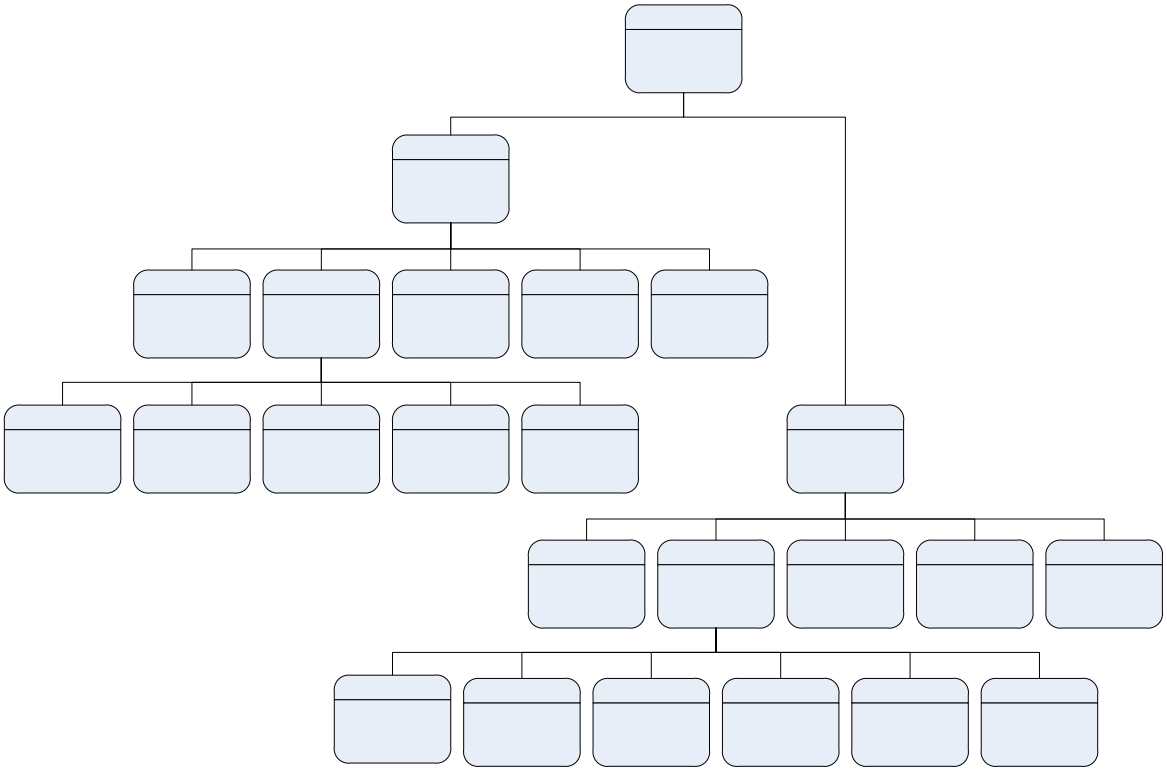

Figure 3: Subordinate Diagram of Physics Learning Application

Figure 3 represents the diagram used for Physics learning application. There are two menus in this application i.e. gravitation menu and work and energy menu. Those two menus comprise of look at curriculum, look at material, discussion, evaluation, and look at variation. In the gravitation menu, there are 5 topics presented; they are Newton Laws Universal Gravitation, gravitational field, Keppler, strong Gravitational field and explanation of the formulae. In the look at material process on work and energy menu, there are six (7) topics. They are, work, work relation and kinetic energy, potential energy, kinetic energy and Law of mechanical energy.

Interface Application Design

Generally, the interface application design consists of four (4) main parts i.e. header, menu, content, footer.

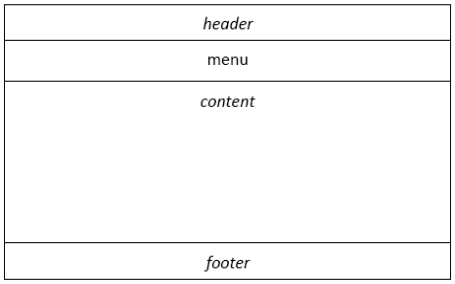

Figure 4: Interface Application Design

In Figure 4, it can be seen that (1) Header area contains the title of this learning application. (2) Menu area contains all the menus that could be run in this application starting from the curriculum menu to variation menu. The menu area will connect one menu to the other by choosing one of the available menus, then it will display the corresponding interface. (3) Content area contains the content of each topic and covers the curriculum, theories/material, discussion or lab, evaluation and variation. (4) Footer area contains of exit and back buttons. Exit button will directly close the application and the back button will direct to the main menu which is the topic options.

4. Result and Discussion

This learning application is multimedia-based one in which the material is delivered using simulation in accordance with the topic chosen. With the simulation offered, it is expected that students will understand the material given in a much easier way. There is also a simulation of the formula calculation so that the students could get the opportunity to implement the formulae presented in the chosen topics. Apart from those features, students could also discuss about the questions presented in the application and they could assess their achievement on how much they could achieve the objectives set using the evaluation menu.

Intro Menu

Intro menu is the very first interface of the application. It is shown in Figure 5.

Figure 5: Intro Menu

Main Menu

There are two topic menus in the main menu interface; they are gravitation menu and work and energy menu. Besides, it displays exit button if the user does not want to continue using the application and want to close instead. The interface is shown in Figure 6.

Figure 6: Main Menu

Gravitation Main Menu

The gravitation main menu will be displayed when the user chooses the gravitation menu on the main menu. The gravitation menu contains five (5) menus; they are curriculum, material, discussion, evaluation and variation menu. Apart from those menus, there is also exit and back button. The exit button will directly close the application and the back menu will display the main menu of the application. In the gravitation menu, there is loader which can be used to call the menus chosen in the gravitation main menu. The work and energy main menu consists of the same menus as the gravitation main menus. The gravitation main menus interface could be seen in Figure 7.

Figure 7: Gravitation Main Menu

Gravitation Curriculum Menu

The curriculum menu display the basic competencies of the gravitation topic, material and the indicator decided. The curriculum menu is displayed on the given loader and it uses the action script run as the user press the curriculum button on the gravitation main menu. This is a fraction of the action scripts used for the curriculum button. See Figure 8.

```
on(release){
 konten_load.contentPath="./kurikulum_usaha dan energi.swf";
}
```

Figure 8: Gravitation Curriculum Menu

Gravitation Material Menu

There are 5 topics in the material menu; they are Newton's Law Universal Gravitation, gravitational field, gravitational acceleration, Keppler's Law and formulae explanation.

Newton's Law Universal Gravitation Material

Newton's Law Universal Gravitation Material is the first material given in which it covers the general theory of gravitation as well as Newton Law along with the formulae used. There is simulation button that could be used to display the simulation of the given material. When the simulation button is pressed then the it will run the action script. The interface of the gravitation of Newton Law is shown at Figure 9 and the simulation could be seen in Figure 10 and 11.

```
on(release){
{
  mySound = new Sound();
  mySound.attachSound("GOO");
  mySound.start(0,1);
}
gotoAndPlay(5);
}
```

Figure 9: Newton's Law Universal Gravitation Material

Simulation II of Newton gravitation will be displayed when user press next button. There is

input column for implementing the gravitation formula. It could be done when the user have inputted the input. Therefore, this will run in accordance with the input given.

Figure 10: Simulation on 1st Newton Gravitation

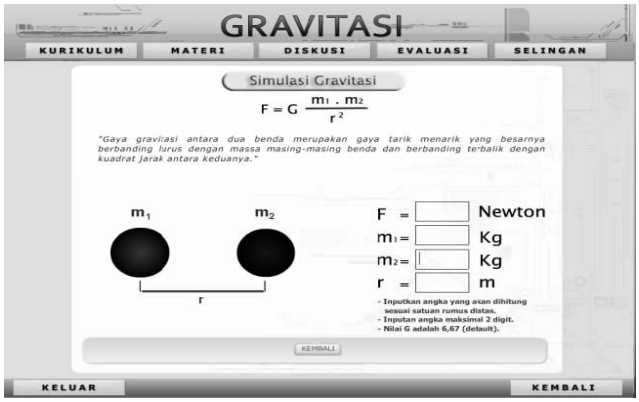

Figure 11: Simulation on 2nd Newton gravitation

Gravitation Discussion Menu

The gravitation discussion menu provides four (4) choices of discussion. It is expected that by giving discussion options will increase the interest of the students when they want to do a discussion. Each menu in the discussion has different questions as well. The interface of this menu could be seen in Figure 12 and 13.

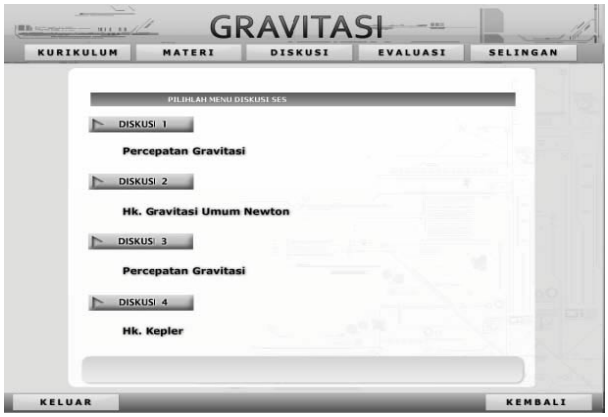

Figure 12: Gravitation Discussion Menu

Figure 13: Question for Discussion

The discussion menu also provides answer sheet for the user to answer the questions they discuss on the discussion menu. The interface of the answer sheet could be seen in Figure 14.

Figure 14: Gravitation Discussion Answer Sheet

Gravitation Evaluation Menu

The questions given on the evaluation menu is displayed randomly from the 15 questions. It will be displayed randomly per section. Each section of the evaluation consists of 5 questions. When the user finishes the evaluation then they will also be able to know their achievement. The user just needs to press to result button. It will then display a message box informing the result of the evaluation. The interface of the evaluation done by the user is shown in Figure 15.

Figure 15: Evaluation Menu

Variation Menu

Variation menu is a menu containing any information related to gravitation. It can be seen in Figure6.

Figure 16: Variation Menu

Testing

After the implementation stage, then the application moves to the next stage which is testing. The testing is carried out at school involving SWCU high school in grade 11 and the physic teacher. This testing is intended for knowing the appropriateness of this application. Besides, it is done to know the difficulty the users may find. The results of the testing to 30 students with 3 teachers are shown in Table 1 and 2.

Table 1: Testing Result to the students

Average before using application	Gravitation Material	68
	Work and Energy Material	59.67
Average after using application	Gravitation Material	79.67
	Work and Energy Material	81.67

Table 2: Result testing to the teacher

Average of appropriateness of Gravitation Material	90
Average of appropriateness of Work and Energy Material	86.67

Black box testing is carried out to see whether or not the system runs as it is expected in the requirements. Basically the testing is carried out by testing all the features in the application. All menu could run well in the testing. It means that the application has successfully done what it is supposed to do as the requirements say.

5. Conclusion

To sum up with, the application made for this study could be use to facilitate students in learning physics. With the multimedia integrated in this application, students could do simulation on each topic offered in the application. The use of computer in this case the learning support tool helps the teacher in delivering the material in a more interesting way. The result of the testing done to the students shows that there is an improvement in student's average, it is 27.02% compared to the result when they do not use the application. The testing done to the teacher to see whether or not the material is appropriate. The result shows 88.33. Based on the result obtained, this

application is appropriate and can be used to help teaching learning process especially physics learning. From the black box testing done, this application runs well as it expected.

6. References

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MULTI MEDIA BASED APPLICATION: AN ENGLISH LEARNING SUPPORTING TOOL FOR CHILDREN

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Abstract

The development of ICT has influenced in almost every aspect of education in Indonesia. There have been a lot of applications designed and created to facilitate and support the teaching learning processes. The use of ICT in English teaching learning has also been started since decades ago. The blend of ICT use with interesting material packaging is one of the good points that encourage children in learning English. As the context happens in Indonesia which puts English as the foreign language, then this study propose to design a learning support tool for English, to be specific this application is aimed for 6-8 years old children and emphasizes the mastery of common topics such as numbers, letters, colours, fruits, animals, etc. This application is designed using waterfall method. By going through each stage in the method, it is expected that it could produce the desired application. This is a multimedia based -application; therefore it includes audio and video in the learning module given to the user. It also gives exercises for the children through games and quizzes. At the implementation stage, this application is tested using black box method to see whether or not it could give the function it is supposed to perform. Besides, it also considers the user impression when the application is implemented in the chosen area. As this application is designed in multicolour, then psychologically it could arouse students' intention and interest to learn English. Having done with the testing and implementation stage, it could be concluded that this application has achieved its purpose to help children in learning the common subject and increase their interest to learn English.

Keywords: multimedia, learning, English

1. Introduction

Many countries includes Indonesia have started the English Foreign Language teaching since the last few decades. Even the common phenomenon is that the early childhood learning system has put English as one of the subjects given at school. People in general think that if English learning starts to be taught in the early childhood then it could give better result. However, there has not been much empirical proof regarding this belief. Despite of this fact, it is not impossible that

there are also many adults who start learning English and it works. The increasing number of people learning English due to people thoughts and idea that English is an important subject that they have to master if they want to compete in the global world.

The context of this study takes place in SD Cemara Dua No. 13 Surakarta. This school has used multimedia and ICT tools. However, the teachers at this school usually just prepare the material beforehand with the help of Microsoft Power Point Presentation or Microsoft Word. Therefore, there has not been any basic material that functions as the basis of learning, to be specific is English. In order to help the teachers to make use of the available ICT tools, an multimedia based application is built. This application is intended to help the teaching learning process especially in English subject. This supporting tool is for children aged 6-8 years and focusing on pronunciation. By so doing, it is expected that children will be benefited in learning pronunciation in English and more than that students could be more independent in learning as they could get guidance directly from the application.

2. Review Of Literature

There are two definition of multimedia learning, definition before 1980s and definition after 1890s. Before 1980s era, multimedia learning is defined as a collection of various tools used for presentation. The later era defines multimedia learning as interactively shares or gives information using texts, pictures, sounds, videos or animations. It also emphasizes more on multimedia as an interactive computer-based communication system which has the ability to create, save, give, and retrieve all the texts, graphics, sounds, and videos or animations. The term of multimedia is focused more on the ability to interact between the media and the users of the media [1]. We can also define multimedia is combinations of digitally manipulated text, photographs, graphic art, sound, animation, and video elements. When we allow an end user – the viewer of a multimedia project – to control what and when the elements are delivered, it is interactive multimedia [2].

In general, children have the need of being in the environment which could give the warm comfortable atmosphere to imagine and carry out an activity. The comfort that children want is being relaxed, not depressing, and secure. Besides, children want to get motivation and insight and these are good for their psychological development. To fulfill the feeling of freedom, children need the flexible atmosphere. This could be fulfilled by providing the bright and neutral colours. These colour schemes are the most flexible. Meanwhile, to fulfill the children's need of secure feeling, they need an atmosphere which is not frightening as well as tense. Psychologically, the use of colours should prevent them from being frightened or depressed as exposed in black. The secure feeling could be obtained from the use of colour which is not dazzling which could make eyes tired, headache and tense [3].

The role of colour to support the teaching learning process is not only in creating emotional atmosphere, but also in performing other important roles. There are four roles that could be performed by using colour. Firstly, it is the role of stimulant. Colours could be used as stimulant as found in the use of bright colours such as red, yellow, and orange. These colours attract students' attention and children love these colours. When these colours are used in learning tools then it could trigger the students to do activities. Besides it could activate their imagination

ability. Secondly, colour could be used for evaluating children's development. The evaluation could be done by giving children the same objects in the same colour but different shape or inversely objects in the same colour but different shape like in the puzzle. Thirdly, colour could focus and shift attention. To focus children's attention, give them colour that attracts attention and on the other hand, to shift their attention then give them colour which is not attractive such as brown and grey. Lastly, colour could create sense and feeling such as warm, cold, calm and exciting. The use of bright and contrast colour could create happy and exciting atmosphere.

Children aged 6-8 years have the physical characteristics of growing, easily get tired, and not playing alone as they are already adaptable in group game. Mentally, the have high imagination and think literally in a sense that they could not accept abstract things yet. Their ability to understand the concept of time and space is still limited. Apart from that, their ability to read is increasing and having good memory. However, their logical thinking is still limited. Emotionally, in this age children are easier to express their emotional feeling because they are very sensitive. They like to get their teacher attention to get compliment, care about others, and often feel frightened. Socially, this age is easy to socialize and get adults' attention. Furthermore, they like to work with others and have good relationship with others. However, they do not like to compete with others [4].

3. System Design Method

Design method used to implement the software is waterfall method. This method first came up in 1970 and is often considered as classic method. However, this method is often used in software engineering. This method uses systematic and sequential approach starting from the need analysis, design, coding, and testing. It is known as waterfall because one stage should be completed before moving to the next stage. This method could be seen in Figure 1 [5].

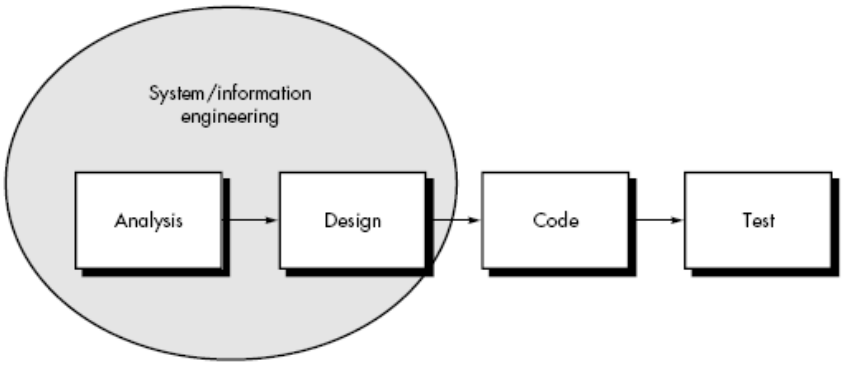

Figure 1: Stages in *Waterfall Model*

Figure 1 is the general stages of waterfall and the following is the complete explanation:

1) *Analysis*

At this stage, the data collection is carried out using observation and review of literature. The participants of the observation are two English teachers that teach English for first and second graders. From the interview and observation, the English teaching learning process is carried out face to face between the students and the teacher with the help of multimedia. Additionally, the teachers use direct method, involving students to real life situation to support the teaching

learning process. Teacher's role is very important in the teaching learning process as they are required to make slides for presenting their material. This observation suggests the appropriate application should be built accommodating the need and circumstances of the teaching learning process. The second method is literature review by reviewing through literature related to education, English, multimedia, Visual Basic 6.0, and any other information related to the theme discussed.

2) *Design*

The design is started from system analysis, interface design and module design. Analysis stage is an activity to determine a more appropriate data classification that supports the application format design. It is done to determine data that is easier to access using Visual Basic 6.0 in the software built.

The input implemented in this application covers introduction to numbers, letters, colours, objects, fruits, animals, dictionary and audio. Meanwhile, the output resulted in the application will be in form of picture, writing, and audio in English.

The module design is presented in UML using the flow chart system showing how the system is going to be placed and implemented physically so that it will show the direction of data flow of a process. From the interview and observation, it can be seen that there is a functionality that the built application has to have. By having the determined functionality, a structured system could be designed. This is shown in the use case diagram (See Figure 2).

From Figure 2, there is a user of the application. The user is the students aged 6-8 years and the English teachers. User has all functionalities of the application such as number, letter, colour, object, fruit and animal learning, dictionary and audio.

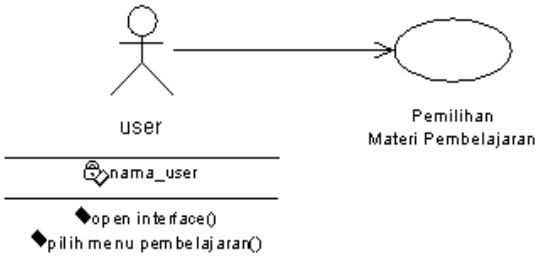

Figure 2: Use Case Diagram of English Learning Supporting Tool

Activity diagram is used to document the work flow of a system. In the application built, there is one actor interacting with the system called as user. It is the actor that could manage all the data. It has three activities that could be repeated, they are open interface, choosing the learning material and the learning which is in accordance with the material (See Figure 3)

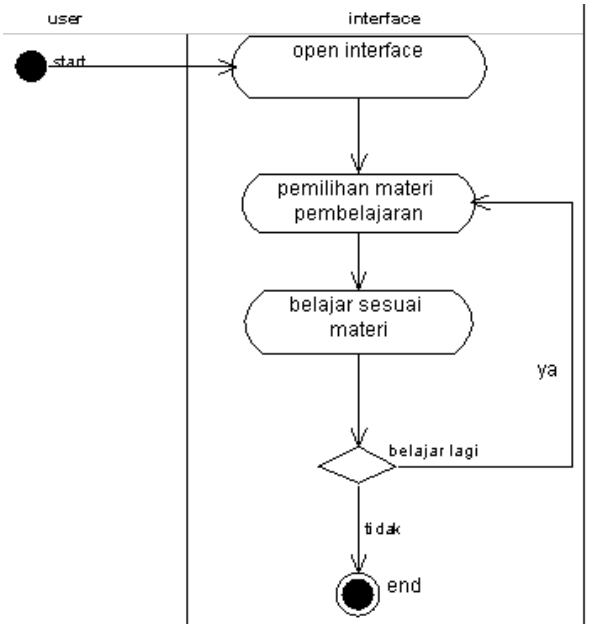

Figure 3: User Activity Diagram

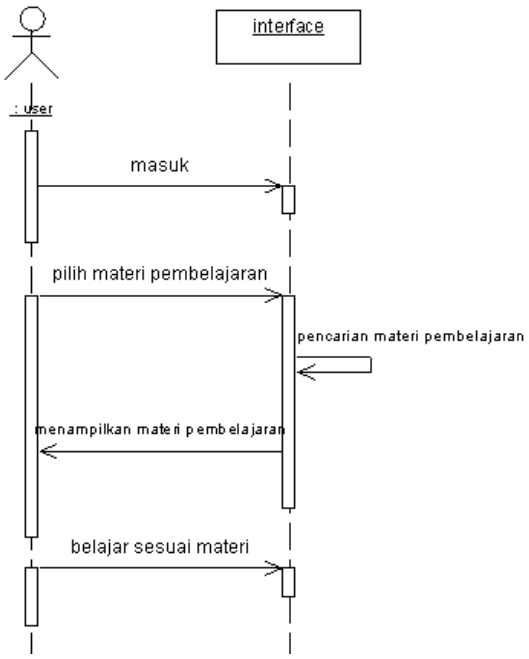

Figure 4: Sequence Diagram User

Sequence diagram shows the interaction between the objects in and around the system including user, display, etc. Sequence diagram consists of vertical dimension (time) and horizontal dimension (related objects). Sequence diagram is used to describe scenario or sequence of steps taken as a response of an event to generate a particular output. This starts with what triggers the activity, process, and changes happen internally as well as output resulted. This is shown in Figure 4 that describes the sequence diagram done by user.

Implementation is a stage of interpreting related class into an object model into programming language, which is Visual Basic 6.0. This implementation stage is also known as coding. Coding is the making of this program, all the data is considered as the unprocessed data. Those unprocessed data is then classified to input into the application. At this stage, program design is carried out in line with the requirements and problem in a sense that the interface graphic is designed in a way that it will be easy for the user to follow the instruction displayed in the program. The program designed is developed into program modules. This module is done separately and will be developed when it is already appropriate to the one expected. The final result of this program design and modules is informed of ready use application.

The interface design is related to the display of the application. It is important because a good and interesting program display will attract the user's attention and will not make them bored. The display of this program covers Main Menu Form, Numbers Form, Letters Form, Colours Form, Fruits Form, Animal Form, Dictionary Form and Audio Form. In the main form, there is a link to the core form such as numbers, letters, fruits, animal, object, dictionary, and audio forms. This form is the starter display when the program is run (Figure 5).

Numbers Form is used for learning numbers in English by choosing one or number buttons or typing the number the user wants. It will result an output in form of writing or letters showing

the pronunciation of the corresponding number along with the sound accompanying the pronunciation (See Figure 6).

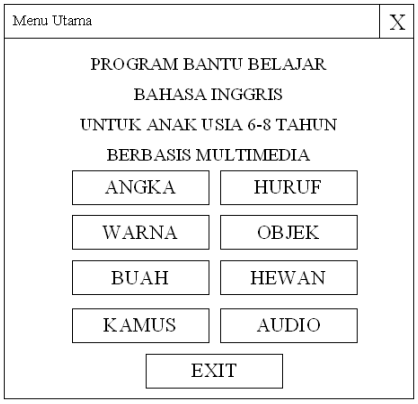

Figure 5: Main Menu Form Design

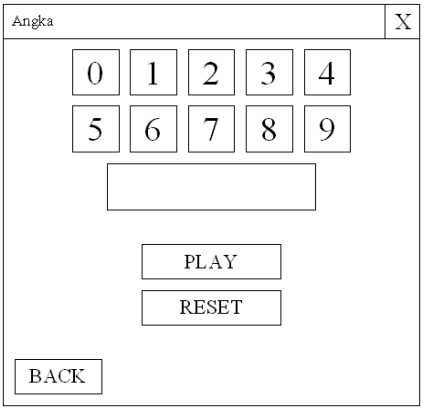

Figure 6: Number Form Design

Letter Form is used to learn letters, words and some simple sentences in English. This is done by choosing or typing letter, word, or sentence then it will give the output in form of writing, letter, and pronunciation of the letter, word, and sentences along with the sound. Besides, it has text box in which the user could input letters; 100 is the maximum. The design of letters is similar to the number form. The only difference is the writing of numbers is replaced by letters.

Colour form is used to learn colours in English which its number is already limited by choosing one object. Then it will result an output of writing or pronunciation of the chosen colour. Besides it will give a sound output of the corresponding pronunciation in English. See Figure 7.

Object Form is used to learn the name of object in English. The number of the object is limited by choosing one picture of the object. It will then result an output of writing or pronunciation of the name of the chosen object. Besides, it will result a sound output of the corresponding pronunciation (See Figure 8).

Fruit Form is used to learn the name of the fruits in English. The number of the fruits has been limited by choosing one picture of the fruits. It will then result an output of writing or pronunciation of the chosen fruit. Besides, it will result a sound output of the corresponding pronunciation. The design of this form is similar to the object form. The picture of the objects is replaced by the picture of fruits. It applies as well for Animal Form.

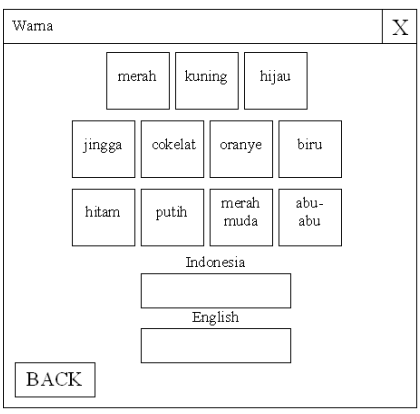

Figure 7: Colour Form Design

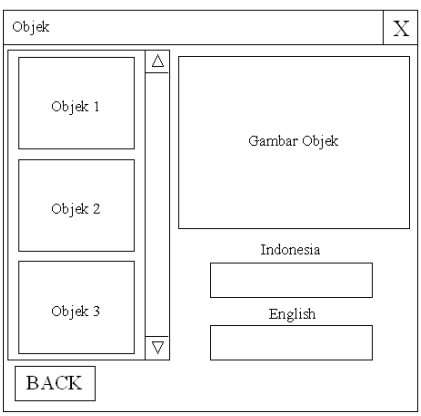

Figure 8: Object Form Design

Dictionary Form is used to learn words in English (Indonesian-English Dictionary), and the number is limited to verbs. The user could input the intended verb, when it is found in the database then it will result an output of words in English. Besides, it will result a sound output of the pronunciation of the corresponding verb. When the word is not in the data base then the system will give a warning saying that the word is not in the provided data base. See Figure 9.

Audio Form is used to recognize songs in English. It could be found in a particular folder by choosing the available ones then it will result an output shown in the play list. See Figure 10.

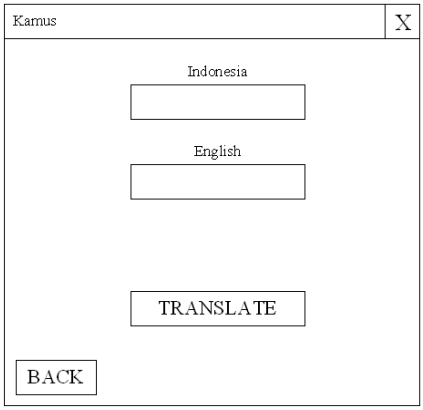

Figure 9: Dictionary Form Design

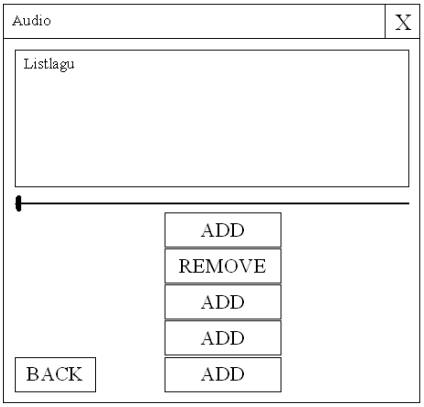

Figure 10: Audio Form Design

3) *Code*

In order to be understood by the machine, in this case is computer, the design should be converted into a form that could be understood by the machine using programming language. This is carried out through the use of Visual Basic 6.0. This is in implementation stage from design into technical. Testing is also carried out, but it is done in unit level only. The complete explanation will be in result and discussion section.

4) *Test*

At this stage, all the integrated units will be tested as a whole. All the functions in the software will be tested so that there will be no errors found. Furthermore, the results should be in accordance with the requirements or needs defined in the previous stage. This software will be tested by the user, children aged 6-8 years and the English teachers of that particular school chosen for this study.

4. Result and Discussion

The implementation of the application is presented as follows.

1) Main Menu Form

Main Menu page is the first page that is seen by the user when the user accesses this application. The first time the system run, then the first display is the main menu as seen in Figure 11. This form presents information about the title of the system and the nine buttons which are number, letter, colour, object, fruit, animal, dictionary, audio, and exit. Each of them is linked to another form.

2) Number Form

The number form, as seen in Figure 12, will introduce number in English. In this form, there is number buttons which could result a sound output for each number. Besides, there is textbox in which the user could input number with the maximum number is 9 digits. The output will be the sound of pronunciation of the corresponding numbers. Play button is used to produce the sound. The speed and volume could be adjusted to the position the user wants. There is also Reset button used for resetting the textbox used previously. The back button is used to navigate to the main form.

Figure 11: Main Menu Form

Figure 12: Number Form

3) Letter Form

Letter form will introduce letters in English. There are letter buttons that result sound output for each letter. Besides, there is text box in which the user could input letter and will result a sound of corresponding letter. Play button is used to produce the sound. The speed and volume could be adjusted to the intended position. There is also Reset button which is used to reset the textbox used previously. Back button is used to navigate to the main form.

4) Colour Form

Colour form as seen in Figure 13, will introduce colours in English. There buttons of basic colours which could result in sound output of the corresponding pronunciation. The speed and volume could be adjusted to the intended position. Back button is used to navigate to the main form.

5) Object Form

The object form, as seen in Figure 14, will introduce objects in English. There are object buttons in this form that could result a sound output of the name of the object. The pronunciation of the object name in English will be produced when the button is pressed. The speed and the volume could be adjusted the wanted position. Back button is used to navigate to the main form.

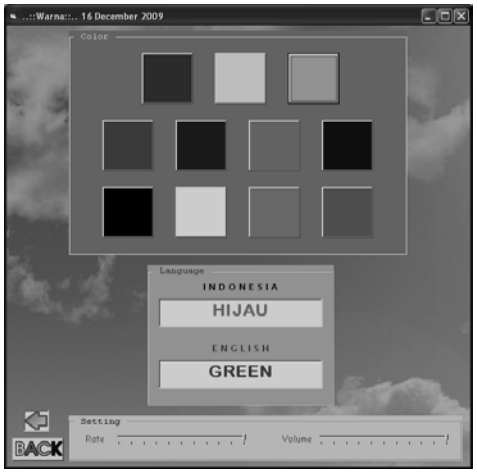

Figure 13: Colour Form

Figure 14: Object Form

6) Fruit Form

Just like the object form, the fruit form will introduce fruits in English. There fruits buttons that could result the output of the name of the fruit and its pronunciation. The pronunciation is in English. The speed and volume could be adjusted to the wanted position. There is a back button that can be used to navigate to the main form.

7) Animal Form

Animal form will introduce name of animals in English. There animals button that could result an output of the name of the animal and sound of its pronunciation in English. The speed and volume could be adjusted to the wanted position. The back button is used to navigate to the main form.

8) Dictionary Form

In the dictionary form, as shown in Figure 15, there is a textbox which function to give input to the user manually so that it could give the output in writing and sound which is the translation of the words input. The input is limited to the verbs only. Therefore, if the word input is not a verb then it will display a warning saying that the word could not be found in the database. The speed and volume could be adjusted to the wanted position. There is a back button that could be used to navigate to the main form.

Figure 15: Dictionary Form

Figure 16: Audio Form

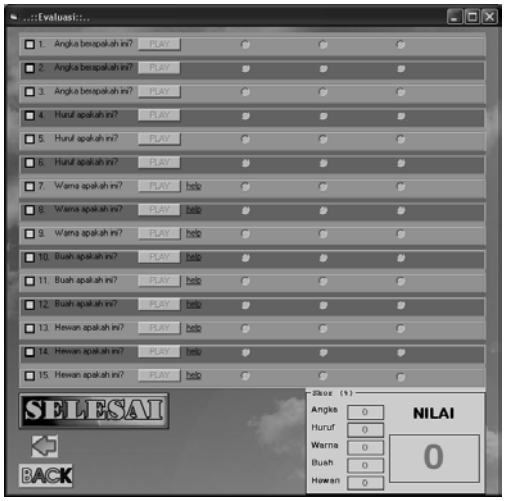

Figure 17: Evaluation Form

9) Audio Form

Audio form (Figure 16) will display a list box that functions to place the playlist. To find the playlist, use Add button, to delete the unwanted playlist use Remove button. Clear button could be used to delete the content of previous playlist. The user could play the song by pressing Play button and Stop for stopping the song. Back button is used to navigate to the main form.

10) Evaluation Form

Evaluation form (see Figure 17) will display 15 multiple choice questions. They have been randomized before. The questions consists of number, letter, colour, fruit, and animal. To answer the question, click at the corresponding option. After finished with the questions the score will be displayed on the screen. After the implementation stage, then it comes to the testing stage. This application has been tested to the English teacher at the chosen school for this study. It has also been tested to the students aged 6-8 years. For the teachers, the testing include interview and answering written questions. From the result, it shows that this application is useful and helpful in the Englihs teaching learning proccess as it can be adapted with the child development curriculum and school curriculum as well. For the students, the testing has been carried with the students as users to run the application. They have to answer the evaluation questions in that application. The testing result is presented in Table 1.

Table 1: The Testing Result for Students Aged 6-8 Years

1st graders	Average of recognising Number	94.04
	Average of recognising Letter	91.66
	Average of recognising Colour	100
	Average of recognising Fruit	92.85

	Average of recognising Animal	97.61
2nd graders	Average of recognising Number	97.43
	Average of recognising Letter	94.86
	Average of recognising Colour	100
	Average of recognising Fruit	91.02
	Average of recognising Animal	93.58

Apart from the previous testing, there is also black box testing to see whether or not this system runs as it is expected. This testing is shown in Table 2.

Table 2: Black Box Testing

Menu	Event	Status
Main Menu	Choosing menu that is going to learn : Number, Letter, Colour, Object, Fruit, Animal, Dictionary, Audio, or Evaluation	Successful
Number Menu	• Pressing 0-9 button to listen the pronunciation of the pressed number. • Typing 9 digits of number in maximum in the available textbox and listening to the pronunciation of the number input. • Resetting the number typed in the text box • Adjusting the speed and the volume	Successful
Letter Menu	• Pressing A-Z button to listen to the pronunciation of the pressed letter. • Typing letters; 100 in maximum in the text box to listen to the pronunciation of the letter • Resetting the letter input in the text box • Adjusting the speed and the volume	Successful
Menu	Event	Status
Colour Menu	• Pressing colour button and listening to the corresponding pronunciation • Reading the colour from the colour button in Indonesian and English • Adjusting the speed and the volume	Successful
Object Menu	• Pressing object picture to listen to the pronunciation of the chosen object • Reading the name of the object in Indonesian and English from the corresponding chosen object	Successful

	• Adjusting the speed and the volume	
Fruit Menu	• Pressing the picture of fruits and listening to its corresponding fruits • Reading the name of the fruits in Indonesian and English of the corresponding fruits • Adjusting the speed and the volume	Successful
Animal Menu	• Pressing the picture of animal and listening to its pronunciation • Reading the name of the animal in Indonesian and English • Adjusting the speed and the volume	Successful
Dictionary Menu	• Writing the verb in the text box • Viewing and listening to the verb after pressing the Translate button • Adjusting the speed and the volume	Successful
Audio Menu	• Choosing song from the hard disk by pressing Add button. • Listening to the chosen song by pressing Play button • Deleting song from play list by pressing Delete button • Clearing the play list using the Clear button	Successful
Evaluation Menu	• Doing the evaluation which covers all materials learned • Viewing the score	Successful

5. Conclusion

From this study, it could be concluded that the multimedia-based application used for supporting English learning for children aged 6-8 years old is very useful. It is useful in term of their development in learning English as seen from the testing done. Besides, this application uses simple material but always in accordance with the curriculum. This helps the students as it gives stimulant to the students since is equipped with sound and colours. The black box testing done shows that the system runs well as it is expected previously.

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CHARACTERISTICS ONLINE LEARNER

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Abstract

Almost all of meaningful and purposive learning is the result of intended interaction which is called instruction. Interaction itself has many form and resources, depending on the condition and situation. Therefore, instructional paradigm for facing the future challenge should be based on the basic principles of learner centered and application of various yet appropriate learning resources. Globalization has stretched the scope of the online learner population from a homogeneous profile of mostly adult, mostly employed, place-bound, goal-oriented, and intrinsically motivated to one that is heterogeneous, younger, dynamic, and responsive to rapid technological innovations. This paper describes in the emerging characteristics of the online learner and ensuing pedagogical implications and suggests that exploratory and dialogical online learning pedagogical models are most effective for supporting and promoting these characteristics.

Keywords: *Characteristics Online learner, emerging Online learner, Pedagogik Implication, Successful online learner.*

1 Introduction

The research to date has not converged on an archetypal proñle of the online learner, Although some situational, affective, and demographic characteristics may cut across this learner population, what seems to be more prevalent is the changing or emerging nature of the online learner and the multiplicity of learning styles and generational differences represented. This situation carries considerable pedagogical implications for the design of online learning environments and necessitates a review of the research to determine the characteristics and skills of the emerging online learner. Determining the characteristics and educational needs of the online learner may not necessarily guarantee success in a distance education course or program (Galusha, 1997). It could, however, significantly help administrators, teachers, and instructional designers understand (a) who is likely to participate in online learning, (b) what factors or motivators contribute to a successful onIfne learning experience, and (c) the potential barriers detering some students from participating in or successfully completing an online coxrae. In order to better understand the sharacteristics and perceived skills of the online learner and the underlying motivations and barriers that impact successful online learning experiences, a review of the characteristics of the traditional or classic distance education learner is essential,

2 The Classic Distance Education Learner

Earlier profiles of the online learner can be traced to classic distance education settings (e.g., correspondence or home study) where most learners were adults with occupational, social, and family commitments (Hanson et al., 1997). The National Home Study Council (NHSC) founded in 1926 collected information about its students and created the following demographic profde for home study students (Lambert, 2000): "Average age is 34 yeam; 66% are male; 25% have a college degree; over 50% have had some college education; and over 75% are married" (p. 11). Home study students were also described as self-motivated, goal-oriented, and disciplined self-starters.

A student's academic self-concept was also shown to be a key predictor for success in a distance education setting. Dille and Mezack (1991) studied the profile of students who enrolled in telecourses (courses delivered through television) focusing on locus of control (internal/external attribution of success and failure) and learning style (e.g., verbal, visual, or kinesthetic) as predictors of success among college distance education students. They found that locus of control is a significant predictor of success and persistence in distance education courses. Specifically, students with an internal locus of control (those who attribute success and failure on tasks to personal behaviors and efforts) were more likely to succeed (receive a grade of C or better) and persevere (complete a telecourse) in a telecourse than did students with an external locus of control (those who attribute success and failure on tasks to external or uncontrollable factors such as luck or task difficulty).

Several other studies examined student attitudes, personality characteristics, study practices, course completion rates, and other academic, psychological, and social integration variables to identify barriers to persistence in distance education and determine predictors for successful course achievement (e.g., Bernt & Bugbee, Biner, Bink, Huffman & Dean, 1995; Fjortoff, 1995; Garland, 1993; Laube, 1992; Pugliese, 1994; Stone, 1992; 1993;). Overall results of such studies indicated that intrinsically motivated learners possessing a high internal locus of control, coupled with a positive attitude toward the instructor and a high expectation for grades and degree completion were more likely to succeed in a distance education course.

Interestingly, individual learning style did not prove to be a significant predictor of success, the rationale being that distance education is inherently accommodating for a variety of learning styles (Dille & Mezack, 1991). This finding is consistent with the pedagogical characteristics of technology supported learning environments and, in particular, Web-based or online learning environments that emphasize interaction and collaboration. Such environments are multimodal (support audio, video, and text), provide individual and group interaction spaces in synchronous and asynchronous formats, support linear and nonlinear representation of content, and provide a variety of learning tools to cater to a variety of individual learning styles. As Brown (2000) stated, "The Web affords the match we need between a medium and how a particular person learns"(p.12).

3 The Changing Nature of the Distance Education Learner

The distance education learners share broad demographic and situational characteristics, no concrete evidence indicates that this group is homogeneous or unchanging (Thompson, 1998). I n fact, the current profile of the online distance learner can be characterized as emerging, responsive to rapid technological innovations and new learning paradigms, and progressively including a younger age bracket. In a recent Sloan Consortium report on the state of online learning in the United States, Allen and Seaman (2006) reported that undergraduates represented 82.4% of the total population of higher education students taking at least one course online.

Who are increasingly growing up with Internet and Web-based technologies such as search engines, instant messaging, massive multiplayer online role-playing games (MMORPG), podcastine, vodcasting, social bookmarking and folksonomies, are well prepared to engage in online learning activities that support interaction and collaboration (Dabbagh & Bannan-Ritland, 2005). In addition, distributed online learning delivery models such, as knowledge networks, learning communities, asynchronous learning networks, and knowledge portals, are designed to effectively meet the characteristics of this emerging learner population. These models support interacting with peers in virtual spaces on team projects, engaging in online discourse, researching term papers using Web-based resources, and developing Web sites and digital products to demonstrate learning. Although Generation Xers (born 1960-1980) continue to represent the majority of online distance education learners, generation Nexters (born 1980-2000) will soon represent a sizable portion of this population, bringing with them new communication and technological skill sets.

The distance education population as a whole is also becoming more heterogeneous or diverse, encompassing students from a variety of cultural and educational backgrounds (Dabbagh & Bannan-Ritland, 2005). Globalization of distance education has enabled students from across the globe to participate in online learning activities, such as joining moderated listservs, participating in online seminars, and sharing information through knowledge portals. Additionally, distance education learners are becbming less location bound. Thompson (1998) elaborated on this point as follows: "lnereasingly, students in close proximity to traditional educational institutions are choosing distance study not because it is the only alternative, but rather because it is the preferred alternative" (p. 13). Attraction to innovative technology-mediated learning environments and flexible course delivery schedules are two of the reasons listed for the desire to be outside the educational mainstream.

4 The Emerging Online Learner

The concept of the independent, place-bound, adult, self-motivated, disciplined self- starter, and goal-oriented learner, which largely characterized the classic distance education learner, is now being challenged with socially mediated online learning activities that de-emphasize independent learning and emphasize social interaction and collaboration. As stated by Anderson and Garrison (1998), "The independence and isolation characteristic of the industrial era of distance education is being challenged by the collaborative approaches to learning made possible by learning networks" (p. 100). Therefore,

online learners must be ready to share their work, interact within small and large groups in virtual settings, and collaborate on projects online or otherwise risk isolation in a community growing increasingly dependent on connectivity and interaction. Given this new context, what are the perceived characteristics and skills of the emerging online learner?

The interpersonal and communication skills and fluency in the use of collaborative online learning technologies are critical competencies for the online learner (Dabbagh & Bamfan-Ritland, 2005). Williams (2003) found that interpersonal- and communication-related skills (which include writing skills) dominated the top 10 general competencies across all roles in distance education programs supported by the Internet. Powell (2000) described the online learner as someone who is "very comfortable with written communications, somewhat savvy with Web technologies, and proficient with computers." Additionally, Cheurprakobkit, Hale, and Olson (2002) reported that lack of knowledge and skill in the use of online learning technologies, particularly communication and collaborative technologies, could present barriers to learning for students in online learning settings.

Another important characteristic of the online learner that carries forward from the profile of the classie distance learner is self-directed learning. Self-directed learning can be described as the skill of "learning how to learn," or being metacognitively aware of one's own learning (Olgren, 1998, p. 82). Cheurprakobkit et al. (2002) reported that students in online learning environments must possess "self" behaviors such as self- discipline, self-monitoring, self-initiative, and self-management, which are characteristics of self-regulated or self-directed learning. Given the physical absence of an instructor in online learning, the ability of learners to monitor and regulate their own learning is critical.

Furthermore, online learners must understand and value the learning opportunities afforded by collaborative and communication technologies in order to engage actively and constructively in learning. Some learners are inherently drawn to peer interaction or collaboration, while others need to understand the educational value of these pedagogical constructs. Being inherently drawn to interaction can be characterized as an individual difference referred to in the literature as the need for affiliation. In online learning environments the need for affiliation can be interpreted as the need to be connected or to belong to supportive groups (MacKeracher, 1996).

A community of practice (COP) is an example of how the need for affiliation can manifest itself in online learning environments. Members of a COP understand that a social mind is at work and that knowledge is a shared intellectual capital. COP is a pedagogical model grounded in a theory of learning as a social process and implemented in an online context through knowledge networks, asynchronous learning networks, and other Internet and Web-based collaborative and communication technologies (Wenger & Snyder, 2000). Although online learners still need to (a) act competently on their own; (b) have confidence in their knowledge, skills, and performance; and (c) learn how to create and manage a personal presence; sensing or exhibiting a need for affiliation is key to a successful and meaningful online learning experience (Dabbagh & Bannan-Ritland, 2005)

5 Characteristics of the Online Learner

In summary, the following characteristics and skills are perceived as critical to the success of the online learner:

- Having a strong academic self-concept.
- Exhibiting fluency in the use of online learning technologies.
- Possessing interpersonal and communication skills.
- Understanding and valuing interaction and collaborative learning.
- Possessing an internal locus of control.
- Exhibiting self-directed learning skills.
- Exhibiting a need for affiliation.

Competency in the use of online learning technologies, particularly communication and collaborative technologies, does not guarantee meaningful interaction, collaboration, and knowledge building in online learning environments (Lindblom-Ylanne & Pihlajamaki, 2003). Therefore, in addition to the previously listed characteristics and skills, online learners should possess or develop collaborative learning skills independent of these technologies. These skills include social learning skills, discursive or dialogical skills, self and group evaluation skills, and reflection skills (Comeaux, Huber, Kasprzak, & Nixon, 1998; Spector, 1999). Each of these skill sets are briefly described in the following section.

6 Social Learning Skills

Social learning skills support decision-making, communication, trust building, and conflict management, all of which are important components for effective collaboration. Social learning skills are needed to assume leadership roles as well as other roles typically assigned in teamwork.

7 Discursive or Dialogical Skills

Discursive or dialogical skills include the ability to discuss issues (being discursive), share and debate ideas, negotiate meaning, demonstrate openness to multiple perspectives, and possess good articulation and listening skills.

8 Self and Group Evaluation Skills

Self and group evaluation skills include learning how to be individually accountable for (a) being active and engaged in group activity (b) doing a fair share of the work and (c) helping other group members to demonstrate competence and learning achievement (i.e, promotive interaction).

9 Reflection Skills

Reflection skills include the ability to apply frequent and substantive consideration and assessment of one's own learning process and products and the group's learning process and products. Learners must be skilled in time management and orienting strategies that help them prepare to learn, and in cognitive learning strategies that help them interact meaningfully with the learning content. In addition, time-management skills and orienting strategies have a direct impact on collaborative learning in terms of effectively and efficiently carrying out the responsibilities of being an active and accountable member of a group. Cognitive learning strategies, on the other hand, are perceived to be most relevant to an individual's ability to reflect upon, monitor, and assess one's own learning when carrying out a learning task.

To summarize, a successful online learner should

1. Be skilled in the use of online learning technologies, particularly communication and collaborative technologies.
2. Have a strong academic self-concept and good interpersonal and communication skills.
3. Have a basic understanding and appreciation of collaborative learning and develop competencies in related skills.
4. Acquire self-directed learning skills through the deployment of time management and cognitive learning strategies.

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INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN LANGUAGE LEARNING

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Abstract

In terms of learning a language, coping with the artificial situation in class instead of real life condition, losing interest, being easy to forget previous lessons, and too much relying on teacher are problems for language learners. A communicative approach is needed to overcome these problems. The help from Information and Communication Technology (ICT) is argued can improve language learning. Although the biggest challenge in applying ICT is investing much time and money, the advantage from its result is far bigger.

Keywords: ICT, language learning, and communicative approach

1. Introduction

For beginners, learning a new language can be frightening as this grabs him to the whole new concept which is socially and culturally different from their regular days. Not only the language they have to learn but also the culture of the target language (Olaniran,2009,75). Because of this, they rely on the teacher so much that they find it unnecessary to review it by themselves . Furthermore, when the teaching method is unattractive, they tend to lose interest and the target language they have learned will be forgotten as soon as the course finished.

Meanwhile, for intermediate learners, studying the language can be boring as they have repeated and reviewed the same rules of the target language for several times from the beginning he learned the language. To some extent, the language learners are easy to forget what they have learned. This may cause from themselves who are too much relying on teacher. They do not want to review the language outside the class. Even if for those who have already mastered the language, they tend to use the language not in the social context needed in the situation. This happens because the situation in class is artificial and not the real one in life (Warschauer & Haley, 1998,24). In order to encounter the problems in language learning both for beginner and intermediate language learners, ICT (Information and Communication Technology) is used. It is argued that the help from ICT can improve language learning process.

The aim of this paper is to study ICT in improving language learning. It includes three main parts. The first part explains language learning competence needed in mastering a language. The second part illustrates ICT in education and how it can answer language learning problems. In this case, Moodle (Modular Object-Oriented Dynamic Learning Environment) is used as a concrete example. The third part is the challenge of applying ICT in studying the language. The fourth part concludes that in spite of much investment needed in using ICT as well as its challenges, the advantages resulted from ICT is far bigger and can improve language learning.

2. Language Learning Competence

The success of language learning does not merely measured by the oral fluency in speaking the target language. Canale & Swain (1980) in Graham (1997,13-14) argued that there are three language competences which should be highlighted; grammatical, sociolinguistic and strategic competence. The grammatical capability refers to knowledge of lexical items as well as regulation of morphology, phonology, semantics and syntax. The sociolinguistic proficiency deals with the ability to produce sentences suitable with social situations. One should understand the convention of politeness applied in a particular circumstance. The strategic competence concerns with the ability to get the message from the person spoken to although there are few words one does not know. This can be done by guessing gestures or facial expressions.

People may wonder about ways for a language learner in mastering all the three language competences mentioned by Canale and Swain. Being in the country of the target language can be the best answer. Communicating with native speakers in a real life situation can help in improving language learning rapidly. The aspects of grammatical, sociolinguistic and strategic competences can be observed directly which then can be applied in a conversation. Despite its effectiveness, living in the target language country is highly consumptive in terms of both money and time. Therefore, in order to have another effective way of language learning, a real life situation is brought into a class room through information and communication technology or ICT.

3. ICT in Education

This paper focuses on the use of ICT in improving language learning. By using the communicative approach, it is argued that ICT can give students an opportunity to use the language in authentic contexts. ICT, an extended synonym for information technology or IT, consists of all technical means used to handle information and aid communication, including computer, network hardware, and communication software (Monteith,2004,5). In this paper, ICT is limited to ICT in education.

According to Chambers and Davies (2001,10), ICT in education can be broadly categorized in the three following ways; ICT as a subject, a supporting tool and an administrative instrument. Computer study is the example for ICT as a subject. In this case, ICT is treated as the focus of the learning. Meanwhile, education management information system is a good illustration of using ICT as an administrative instrument. Computer-based learning is the one which uses ICT as a tool to support subject such as language learning. Its main aim is to implement ICT Equipments in teaching-Learning process as a

media and methodology not as the focus of the study. At the same time, it is also to familiarise students with the use and workings of computers so they are updated with modern technology.

Bransford (2000) in Sutherland and Robertson (2009,3) stated that computer-based technologies can be powerful pedagogical tools. Not only are they rich sources of information but also extensions of human capabilities for social interactions. In terms of language learning, ICT is a helping media in bringing a real life situation which is loaded with grammatical, sociolinguistic and strategic competence into a classroom. In the beginning of the learning, teacher should introduce the program by explaining to language learners that the technology is used to help them as a complementary secondary resource. They shall not be afraid of not knowing how to operate it as the teacher will assist them until they can stand by their own feet. To illustrate this process clearly, Moodle is used as an example of ICT in language learning.

3.1 ICT in Language Learning: Moodle

Moodle or Modular Object-Oriented Dynamic Learning Environment is one of examples of a helping tool to supplement traditional face-to face course in a classroom. It is an open source course management system available for free on the web (Cole & Foster,2008,ix). Just like it means, to moodle is to describe the process of wander through something as a pleasant tinkering which leads to creativity. To begin using it, teacher must access the course on Moodle website to create a program with the lesson plan he desires and act as an administrator. In doing this, he needs a computer with internet access and a web browser such as Internet Explorer or Mozilla Firefox to install and configure Moodle in a server. Once the program is set up, he can invite his students to make an account in it.

There are many advantages language learners can take from this course management system. They can upload and share materials related to the target language. They can also make a discussion forum and chat. Quizzes from the teacher can be done via Moodle as well which then the assignments are gathered and reviewed. Students can also compare their answers with their friend's answers. In the end, teacher will give grades and record them (ibid,p.2).The learning materials and the assignments are designed based on the real life situation. All the aspects from grammatical, sociolinguistic and strategic competence are taken into considerations. There can be a simulation from a video where native speakers having a conversation which then they involve the students in it by asking them questions. Their answers can be recorded in the program which then will be compared with the correct answer spoken by the native speakers after the students answer it. Another example is that, as Olaniran (2009,16) explained, by chatting online with native speakers from the target language. It will give learners the opportunity to master the language as well as its culture.

From those kinds of assignments, it can be seen that the help from ICT media is not simply to make language learning more interesting. Fernandez (2005,1) suggested that the presence of a virtual environment should be more than just attractive since the main goal is to make it last beyond the visual impact. The material is designed to be memorable so that the contents and abilities may remain in the students' memory. With this technology, the students are able to learn active learning through all senses.

Listening, speaking, reading and writing are mingled in one communicative and interactive activity. As Cope and Kalantzis (2000) in Skortou and Kazoullis (2002,140) said that ICT is used to create a unique pedagogy through multiliteracies. This happens because nowadays the way people communicate has changed due to new technology.

A PDF by Jack Richards (http://tinyurl.com/cltarticle) gives a good overview of the status quo of various approaches to communicative language teaching. In the article "Understanding and Implementing the Clt (Communicative Language Teaching) Paradigm", George M. Jacobs and Thomas S. C. Farrell, RELC Journal, Vol. 34, No. 1, 5-30 (2003), the authors highlight some of the key features of CLT. As the following table shows, Moodle accommodates these features well.

Key features of CLT (based on Jack Richards, 2006, and Jacobs and Farrell, 2003)	**Moodle features which support CLT** **Learner autonomy**:
Learner autonomy: Giving learners greater choice over their own learning, both in terms of the content of learning and processes they might employ. The use of small groups is one example of this, as well as the use of self-assessment.	• Customization of learners' home pages if **My Moodle** is turned on • Using questionnaires and polls (Choice module) to allow learners to influence curriculum • Use of wikis for learners to determine processes • Group and groupings feature for dividing students
The social nature of learning: Learning is not an individual, private activity, but a social one that depends upon interaction with others.	• Interaction is built into Chat, Forum, and Wiki modules. • Assignment and Workshop modules allow collaborative writing.
Curricular integration: The connection between different strands of the curriculum is emphasized, so that English is not seen as a stand-alone subject but is linked to other subjects in the curriculum. Text-based learning reflects this approach, and seeks to develop fluency in text types that can be used across the curriculum. Project work in language teaching also requires students to explore issues outside of the language	HTML pages with hyperlinks and webquests are good examples of how Moodle can be linked to the outside world.

classroom.	
Focus on meaning: Meaning is viewed as the driving force of learning. Content-based teaching reflects this view, and seeks to make the exploration of meaning through content the core of language learning activities.	It's easy to incorporate authentic spoken and written texts into Moodle and activities based on them.
Diversity: Learners learn in different ways and have different strengths. Teaching needs to take these differences into account, rather than try to force students into a single mold. In language teaching, this has led to an emphasis on developing students' use and awareness of learning strategies.	• Learners can go at different speeds. • Learners can be grouped accordingto interests, level, and needs. • Teachers can help learnersuse the glossary to build theirown records. • The Journal module allowslearners and teachers to reflecton learning processes and makechanges as a result.
Thinking skills: Language should serve as a means of developing higher-order thinking skills, also known as critical and creative thinking. In language teaching, this means that students do not learn language for its own sake but in order to develop and apply their thinking skills in situations that go beyond the language classroom.	• Wide range of tasks is possible. Chapter 6, Reading Activities shows how Bloom's taxonomy can be used to foster higher-orderthinking tasks. • The Webquest module is a good place to develop critical evaluation skills.
Alternative assessment: New forms of assessment are needed to replace traditional multiple-choice and other items that test lower-order skills. Multiple forms of assessment (for example, observation, interviews, journals, portfolios) can be used to build a comprehensive picture of what students can do in a second language.	Moodle offers traditional tests as well as journals and add-on portfolios.
Teachers as co-learners: The teacher is viewed as a facilitator who is constantly trying out different alternatives; that is, learning through doing. In language teaching, this has led to an interest in action research and other forms of classroom investigation.	• The Workshop and Questionnaire modules make it easy to get learner feedback. • Teachers can also monitor the popularity of different activities by tracking student use.

It should be noted that the goal is to learn the target language in the most productive way. Therefore, the process of teaching and learning should only be done in the target language. Avoidance of the explanation in the local language is suggested. The students, moreover, should not rely on the teacher alone. They must have a responsibility for their own learning. The student who comes to class but rarely uses his target language outside it or who never reviews outside it, will only make little progress (Riddel,2003,8). Through ICT, he can access learning materials from outside class and make the process of reviewing easier. ICT as a didactic tool has contributed to facilitate learners be less dependent to their teacher.S

3.2 Challenges for Language Learning with ICT

Despite its advantages, language learning with ICT has some challenges. Barr (2004,3) said some programs do not consider the role of human teacher and traditional teaching methods. Since the students are dependant, there is a possibility that they ignore the teacher. In fact, ICT in language learning still need the role of the teacher to guide and to assist them. Speaking of guidance, the teacher even needs training so that he will not mislead the students. In this case, it is not only money but also time investment should be applied here. In the first few lessons in the class, the learners may need some time to adjust with the programs. However, as long as the teacher is capable to assist and at the same time motivate the students, once the students understand how the program works, there will not be significant problems.

Another challenge may occur is the cost in providing the computers and internet connection.

One thing should be noted that the gain resulted from language learning with ICT is far bigger than the money invested. It can accelerate people to become multilingual. Aside from its main, that is to reach the curriculum target, being a multilingual is needed not only in economic sphere but also in political and cultural areas. Chambers and Davis (2001,5) illustrates how governments in developing countries nowadays realize the importance of language learning with ICT. They have invested huge amount of money in a number of collaborative projects of language learning and teaching with the integration of tools and resources. It is hoped that the multilingual students are able to have bargaining power in economic, political and cultural spheres.

4. Conclusion

As mentioned earlier that there are loads of problems encountered by language learners. Easily to get bored with the lesson, too much relying on the teacher, and stuck in the artificial situation in class which mislead them to make mistakes in choosing the words are the examples of problems either for beginner, intermediate or advanced level students. It is argued that by using helping tools of ICT, language learners can cope these problems and at the same time improve their ability to study the target language.

By using communicative approach, a real life situation is brought into a class room through information and communication technology in order the students be able to have opportunities in using the language in authentic contexts. This happens because success in language learning is not merely measured by the

fluency of the speaker but also should consider all the aspects from grammatical, sociolinguistic and strategic competence. To see the mechanism of ICT in helping language learning, Moodle (Modular Object-Oriented Dynamic Learning Environment) is used as an example. Students can get their own autonomy in learning the language. They therefore will not rely too much on the teacher. An active learning is persuaded in this case.

Even though there are many advantages ICT may bring, challenges in applying ICT in language learning are ready to block. The biggest challenge deals with money and time investment. One should remember that the gain resulted from language learning with ICT is far bigger than the money invested. It is therefore worth to try to apply ICT in language learning in order to have an improved result.

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APPLICATION OF INTERACTIVE MULTIMEDIA AS MEDIA IN FINE ARTS INSTRUCTIONAL

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Abstract

The ability of teachers to create a learning atmosphere that is fun and effective learning will encourage the development of student creativity and sensitivity. Effective teaching and learning activities should be supported also by the media to learn effectively in addition to text books which are just textual and conventional. More effective use of the media still has not penetrated the field of teaching art. Learning medium that is often applied in the school sometimes just stare at the old teaching methods that have been used to take place from generation to generation without any renewal of schools and teachers.

Methods this study uses a qualitative approach through multimedia instructional in research and development model. Location research on Class X in SMA Islamic Centre at Tangerang City. Inspiration lifted into works of art in the form of interactive media that aims to facilitate the learning process. This research is based on the SK-KD (Standar Kompetensi – Kompetensi Dasar/Competency Standards and Based Competency) that is able to appreciate the works of local art, country, and overseas.

Interactive multimedia as a instructional media development have an impact on learning Art and Culture in the high school class X. The impact of this research is the learning becomes more interesting, the involvement of students in an interactive, motivating, and facilitate students in learning to appreciate art.

Keywords: Interactive Multimedia, Media Instructional, Fine Arts Instructional

INTRODUCTION

Background

Education is very important and related to various aspects of human life that is useful to improve the quality of human resources. Education provides something new and also provide opportunities for students to be creative and learn, with the aim for further developments to make the students better and to escape from underdevelopment. Education has a crucial role in order to improve the quality, progress and development of a country in general and the younger generation in particular, because of the quality

human resources will pave the way for a country to keep developing and leave underdevelopment. Therefore, educational reform must always be done in order to improve the quality of national education.

The curriculum gives to educators about how students will be directed. The curriculum is one factor supporting the success in improving the quality of national education. The Education Unit Level Curriculum (SBC), a teacher is required to become a creative teacher to abandon the conservative way of teaching and replace it with a creative way. These updates usually include the use of techniques and media in learning.

In order to build a creative human being, arts education has a very important role. Basically, the focus of arts education lies in the creativity and sensitivity programs. In the development of creativity, students are encouraged to be able to develop the creativity to be able to be creative. While in developing sensitivity, students are encouraged to be able to develop sensitivism so as to appreciate against the art.

Effective teaching and learning activities should be supported also by the media to learn effectively in addition to books and text that only a textual and conventional. But still hard to find variety of delivery media in teaching art at this time, most still use traditional media in learning systems. More effective use of the media still has not penetrated the field of teaching art. Learning medium that is often applied in the school sometimes just stare at the old learning method is wrong, just listen (one direction) as is common place without any hereditary renewal of schools and teachers. Actually a lot of media that can be used to support student learning process at school. However, less realized by the teachers that the use of media interest can increase students' motivation in school.

The advantages of multimedia is interesting senses and attract, as it is a combination of sight, sound and movement. Research institutions and publishing computer, namely Computer Technology Research (CTR), states that people can only remember 20% of the visits and 30% of the hearing. But people can remember 50% of that seen and heard and 80% of those seen, heard and done at once (Suyanto, 2003:18).

Departing from the opinion, it can be concluded with multimedia can increase students' interest and ability in understanding the art lesson. Fine art is one of learning the scope of art.

Many say that the lessons of art lessons boring and difficult to explain the theory of visual arts have on students. Though the theory that underlies the understanding of fine arts will substantially affect the results of student creativity in the fine arts applications. This happens because of the way of learning the art of insight which also boring, still a lack of alternative media in learning, students only listen to so that the lack of interaction, between students and teachers.

Basically, learning media has two main functions of media as tools and media as sources of learning (Djamarah, 2002:137). For that the media as a learning resource can be used to foster student interest in all kinds of development. One of the major functions of instructional media as teaching aids that help shape the climate, conditions, and learning environment that is organized and created by teachers (Azhar Arsyad, 2008:15). This research theme as an Interactive Multimedia Learning Media arts through interactive multimedia, which is expected to increase motivation and interest the students in appreciation for fine art materials, especially fine arts.

Problem Formulation

How to create interactive multimedia design as a medium of art learning exciting and communicative?

Research Objectives

The purpose of the process of creating interactive multimedia design as the development of instructional media is as follows:

Exploration of creativity in art interactive multimedia design as a medium of learning

Develop creativity of art educators in developing instructional media

Increase student motivation and interest towards learning the art

Produce a more active class in the learning process.

Benefits Research

Based on the analytical usefulness of interactive multimedia as instructional media development in improving the quality of learning, it is seen several benefits as follows:

Improving the quality of teaching in the subject of Art and Culture in the high school class X Islamic Center

Increase interest and motivation of students to the Cultural Arts lessons in high school class X Islamic Center

Generate an atmosphere of Active Learning, Innovative, Creative, effective, and fun (PAIKEM)

Developing teachers' creativity in designing interactive multimedia

as an interesting learning resources.

RESEARCH METHOD

The research method used is a qualitative approach through development model of learning media. This research produced an interactive multimedia work of art as a medium of cultural learning in class X Tangerang SMA Islamic Centre. Inspiration lifted into the form of interactive media art works that aims to facilitate the learning process. This research is based on the SK-KD (Competence and Competency Standards Association) that is able to appreciate the works of local art, country, and overseas. Data collection technique in this research is done through observation, questionnaires, interviews, assignments, and performance. Qualitative data analysis according to the requirements of qualitative research.

RESEARCH RESULTS

In the interactive multimedia that will be designed, the goal will be achieved is in accordance with the Content Standards in 2006 SBC subjects Culture Art (concentration of Fine Arts) for the high school class X. Competency Standards (SK) that will achieve is to appreciate works of art. Basic Competency (KD) is
identify the unique ideas and techniques in works of applied art local area. Learning materials to be provided is the work of textile archipelago. textile works closely connected with the decoration. The ornaments, the pattern is a repetition of the motive, means a number of repeated motifs that structurally viewed as a pattern (Aryo Sunaryo, 2009:14)

Multimedia Basically divided into 2 types, namely static multimedia (Multimedia Linear) and Multimedia Dynamic (Interactive Multimedia). Static Multimedia is a multimedia equipped with any control equipment that can be operated by users, running sequential (consecutive). Users can not interact with the material presented and only runs until the material is finished (autoplay). Examples of video presentations or video CD. (Http://gprime.net)

Interactive Multimedia is a merger of several digital media such as sound, video, and animation so that form-based media to a process of interaction between users with the material presented. The material presented in line with the navigation found on the content of the material. This media is often applied to website design or company profile (http://www.dewey.petra.ac.id).

Multimedia interactive multimedia also called dynamic. Multimedia is a merger of several digital media, thus forming the media that based on a process of interaction between users with the material presented. The material presented in line with the navigation found on the content of the material.

Interactive multimedia has the ability effectively as a medium or a source of learning, because merging the various elements, ie text, audio, video, and animation, so there are 2-way interaction when the computer responds to the user. Relying on users to control multimedia learning materials through the use of navigation buttons.

Multimedia information system development process is interactive art using network infrastructure anywhere such as the use of a PC (Personal Computer) or laptop / notebook usual. Its function as an alternative learning resources can facilitate students to learn effectively.

This interactive multimedia produced directly using a computer and some graphics software, then data burnt with Driver CD is packed into a CD Rom with a file size around 700 Mb. The application of interactive multimedia information system is not independent of the important role the CD Rom as a store of the result of an interactive multimedia design, which was also used as media conveys a series of learning resources in interactive multimedia

Some hardware and other software that is used as follows:

A set of computer with a standard resolution screen format, ie 1024 x 768 pixels that appear in full (full screen)

Software used include: Corel Draw X3, Adobe Photoshop CS2, Macromedia Flash 8, and Cool Edit Pro 2.1

In designing interactive multimedia that both need to be prepared according to the contents of the conceptual aspects of learning materials, technical creation, and filmed a way / visualization that attract appropriate levels of education students. Interactive multimedia designed in this study as one of the art learning resources. Interactive Multimedia is hoped this can be applied as a source of learning in the process of learning in high school. Thus the existence of an alternative learning resource in the form of interactive multimedia art was a way to make the learning of Art and Culture at the high school class X becomes more attractive, so that the expected competence is achieved in accordance with the SK-KD (Competency Standards and Basic Competence) in the curriculum.

DISCUSSION

Interactive multimedia art was made to have non-linear structure of the program, the user can select the desired menu navigation along with the contents contained in the material. Two-way interaction occurs when the computer responds to the user. Simulation can also demonstrate learning through animation and video along with audio.

Interactive multimedia is very useful as an educational media facilities as proposed (Arif Sadiman, 1986:17), that its uses include:

Clarify the presentation of messages

Overcoming the limitations of space, time, resources senses, through images, sounds, and motion

Use appropriate and varied media to overcome the passive attitude of students, because student learning is dynamic and actively participate

Can be tailored to the unique nature and experience a different environment

In the design of interactive multimedia art this may take a few steps, as follows:

Input

In the preliminary design is needed:

Text / Art Materials suitable syllabus subjects Culture Art field for high school students of class X, the software

Picture / image / photo that is required of all converted in digital format

Audio (music, voice, effects) on the capture to *. mp3 format

The process of making

On the whole stage is used in making this interactive multimedia together with the general design plan, namely:

Conduct needs analysis (students in learning)

Collecting materials and supporting data (syllabus, etc.)

Determining teaching materials (Visual Arts)

Develop storyboard to explain the sequence content of the material and brief explanations of each page will be displayed in interactive multimedia art of this (program files)

Initial sketch design (text, images, and audio)

Define background templates and themes

Specifies the icon that will be used

Animating visual elements in the unity of composition design

Inserting sound in application design

Uniting all the multimedia elements into a single unit design using Macromedia Flash 8.

Output

Interactive multimedia products of this art as a medium for communicative learning resources and support activities PAIKEM (Creative Innovative Effective Active Learning Fun) in school. Interactive Multimedia which has been made will be packed into a Compact Disc (CD), making it easier to use on another computer. CD-Rom (Compact Disc-Read only memory) to be the most effective media distribution in terms of cost and its use for this interactive multimedia art.

Interactive Multimedia production system needs to be organized working process for well ordered, as follows:

Beginning with Early Planning: teaching materials (teacher) and alternative design (Teacher / designer) based market segmentation (student and teacher)

Storyboard maker (teacher and designer)

Editing (form, function, technical, design) through the computer, including templates and management of multimedia elements (text, images, audio, and graphics) as well as teaching materials, on each page

Final packaging (packaging)

Users (students and teachers)

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of research conducted and the discussions that have been described, it can be concluded in this study:

Software-shaped form of interactive multimedia instructional package produced can be used to help learning subjects Art and Culture, especially the subject of art, to high school education Tangerang Islamic Centre

Interactive multimedia art is a self-learning based learning tool, so it is expected to create a learning community, which according to the uniqueness of high school, especially art education in high school.

Learning media art which was developed in accordance with the standards of competence, basic competence and indicators of learning in the curriculum unit level education for high school level.

Interactive multimedia art became a source of learning according to student characteristics, resulting in a process of Active Learning More Effectively Innovative Creative (PAIKEM) on the subjects of Art and Culture at the high school class X Islamic Center Tangerang

The development of instructional media art with interactive multimedia-based learning model produces a pleasant learning, thus improving student learning outcomes of Tangerang SMA Islamic Centre

Suggestion

From this research has been done, the authors suggest:

The need for further development of this learning media software, including the need for the addition of a more diverse teaching materials.

There should be more research on the use of interactive multimedia-based instructional media> in other learning, so that more valid influence the development of learning resources on student achievement, especially in high school in Tangerang Islamic Centre

Need to be tested to determine the level of understanding of the learning CDs are made, as well as the development of teaching methods by teachers and practitioners of computer to generate a model of learning activities better.

It is necessary to put up the funds for purposes of software used.

It is necessary exercises to apply the multimedia interaction as a medium of learning, the teacher and student.

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MODEL DESIGN FOR VIRTUAL LEARNING IN MATHEMATICS

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Abstract

Model of virtual learning in mathematics lessons is learning that is designed in the classroom (computer lab) which uses interactive web media, so there is interaction between students and students, students with the media, and students with teachers. In the virtual learning model is designed every single computer is used by two students, which aims to give students collaborate in learning so that there is interaction between them. Interactive learning materials designed so that students can be motivated in learning mathematics. Teachers in this case as facilitators, which motivates students verbally and non verbally (using media website). The work of students in the form of training, evaluation or questions and responses will be stored in the program created, to facilitate teachers to recap students' work.

Keywords: design, virtual learning model

Introduction

The development of information and communication technology (ICT) in recent years, is growing rapidly. This is changing the paradigm of the public in finding information that is not just limited to newspapers, radio and television, but also the source of cyberspace (the internet). One of the most significant impact in the development of ICT is in the field of education, where ICT acts as a medium of communication and information from teachers to students containing information on education, but it also means the media is presenting the idea and the idea of teachers in delivering educational material.

In learning mathematics, students will be more interested if the interactive media can be delivered to them. Presentation charts or examples of problems that are animated will create increased interest in student learning. The task of a learning designer is to present particular media such as gaming math games, so that students will continue to do all it can to resolve these games.

Designing an Internet-based learning (virtual) must be prepared carefully, with a scenario designed Internet-based learning. In designing a virtual learning does not mean merely putting teaching materials on the web, but need to be designed learning that invites the involvement of students actively

and constructively in their learning process to the media, to make the learning process a fun, creative, not a boring process.

The process of learning mathematics is usually done in the classroom by using the media board and other supporting media. The presence of mathematics learning process is also conducted in the laboratory using computer media. Based on observation, often times the utilization of computers has not been designed optimally. Suppose that we often see, the lack of computers resulted in students having to sit in groups of 2-3 people in one computer, but the media is not designed for that (the media designed for 1 person only 1 computer).

Accordingly, this article will focus on how to design virtual learning model based on the limited amount of computer. Virtual learning model which will be designed that combines face-to-face meetings and electronic learning to increase contributions and interactivity among students. Through face-to-face students can get to know fellow students and accompanying teachers. This resulted in a familiarity that supports them in virtual collaboration. Proper preparation prior to implementing a virtual learning plays an important role for smooth learning process. All preparations such as scheduling to the technical determination of communication during the learning process are an important step in implementing a virtual learning.

Virtual Learning

Today, many people are interested to implement the concept of virtual learning in the classroom, called the Virtual Classroom (VC). In implementing the concept of VC, adverse effects will occur when the system designers and teachers to implement the concept is too similar to conventional classroom teaching models and fail to recognize that the concept of VC is a hi-tech situation that requires rethinking of the learning process itself. In these conditions, it is impossible for system designers and teachers to utilize all the potential of the application of VC (Clark, 2008). Everyone is always trying to do things in a short time through the use of technology, especially information and communication technology (ICT).

Many groups have developed a model of learning by making material that can be learned independently through the Internet, the LMS, or CD-ROM. Currently, we are familiar with the concept of asynchronous e-Learning. VC concept offers more promising opportunities for collaboration, connections, access to information, visualization is interesting, and encourage the parties involved to be more productive and quicker in understanding the knowledge. Although asynchronous e-Learning is still relevant to the current applied, the concept of VC is able to provide some options more attractive if it is implemented with the right approach (Marie, 2009).

Interaction is an important element in implementing a virtual learning. But is the interaction here is not the interaction between the people but rather the interaction between learners (students) with materials (content) (Hyder, 2007). In virtual learning, teacher control and to control the interaction, with limited time, teachers must be able to ensure that students can understand the material (content) is presented. The most important thing we can do on a process of learning is through interaction. Participation by as much as possible will be able to prevent the students become bored and lose control

over the material. Teachers can simply by calling the names of the students to condition students felt watched and paid attention. If teachers wish to evaluate the level of student participation during the learning process, teachers can relate the material to the project or assignment that involves more than one student. Virtual learning offers many opportunities to interact. In fact, the task or discussion can be made more easily in a virtual learning than in conventional classes that might require restructuring the tables and so forth. The interaction that occurs in a virtual learning can be meaningful interaction between students and teachers, interaction between students and the media, participation of students in a discussion session, or collaboration among students themselves.

Reality of Learning Mathematics

Someone to achieve success in life must learn well to produce satisfactory progress. Learning to make people have ideals, to be achieved, so that will have a future in the future. Everyone will undergo a process of learning to solve problems faced by various ways and ideas to solve the problem.

Many experts say about the notion of learning, one of them according to Nasution (1994), which concluded that learning in a broad sense is a process that allows the emergence of a behavioral change as a result of the formation of the primary response, provided that the change or the emergence of new behavior is not caused by the maturity or temporary changes for any reason. Meanwhile, according Slamet (2003), learning is a process of individual effort to get something new behavioral changes and get something in the interaction with the environment. So from a second expert opinion, we can conclude the sense to learn is when someone changes the behavior of the learning process, so that someone can use his thinking in problem solving and independent with the knowledge that she can from learning.

In addition, according Nasution (1994), to learn something someone requires four fundamental conditions, namely (1) should want something, (2) pay attention to something, (3) do something; and (4) should get something. In other words we can say that to learn someone requires several conditions, namely (1) there must be an impulse or need, (2) there must be a stimulus or a certain signal so that there is a response whether or not a form of motor actions, (3) must exist thoughts or physiological changes, (4) there should be a reward or affirmation of a thing that I learned.

Learning mathematics in school aims to help students think to solve everyday problems using mathematical calculations. In mathematics learning should pay attention to the teacher how to solve math problems, so that students can understand how to solve them and facilitate students in completing the exercises and apply mathematics in everyday life. With the help of the media, will greatly facilitate the students understand the material, one with a virtual learning.

The interest of the students to take math lessons greatly affect the learning of mathematics achievement, given the interest in students studying mathematics can generate creativity of students in learning math that will produce good learning achievement. If students do not have the interest to follow the mathematics then students will have difficulty in understanding the mathematical concept of completion, so the creativity of students in learning mathematics is not good and learning achievement is also not good. The emergence of interest the students to follow the lesson depending on how or learning

methods and media used by teachers in providing learning materials and guidance to students in improving student creativity.

Use of Websites as a Virtual Learning Media

Education experts and Internet experts suggest a few things to consider before choosing a website as a media person in learning (Hartanto and Purbo, 2002), among others:

a. Needs Analysis (Need Analysis). In the early stages, one thing to consider is whether it requires e-learning. This question cannot be answered or answered with an estimate based on the advice of others. Each institution determines its own learning technologies that are different from each other. For that there should be a needs analysis that includes both technical feasibility, economic, and social.
b. Instructional Design that contains the content of lessons, topics, credit unit, teaching materials / curriculum.
c. Evaluation before the program starts, it's good to be tested by taking several samples of people who asked for help to come evaluate.

Last to be aware of the problems frequently encountered are: a. Problems can carry out access to websites such as the availability of the Internet network, electricity, telephone and other infrastructure; b. Problem of the availability of software (the software). How to create the software that is not expensive; c. impact on the existing curriculum; d. Troubleshooting skills and knowledge.

Design of Virtual Learning Model

1. Elections Media

Not all parts of the learning process should be accompanied by instructions from the teacher, there are times when students need time to think and calm atmosphere to do some things independently, for example to understand a reading or doing a task. Teachers can create such an atmosphere with no instructions or deliver the material continuously. Virtual learning process independently of asynchronous e-learning (without any face to face) who carried out without the need of instruction from teachers. In this case, media selection is very important as an idea of instructional materials and teaching methods that you want, and make a fundamental design decision, which was to determine whether more appropriate to use the media delivery on asynchronous e-learning or using synchronous e-Learning.

A lot of problems may be encountered in the selection of the virtual classroom approach (VC). When implemented with no caution, VC may actually bring up the negative aspects that we encounter in a conventional classroom or on media that are not face to face. In that case, which arises as to the stages in the learning process is too oriented to the instructor or teacher as happens in the physical classroom. This will cause students to become bored. In addition, students may feel overlooked by the instructor or teacher. VC as a process that is synchronous (face to face), require a set of different resource than the concept of e-Learning that earlier (Braman, 2008).VC requires the presence of teachers

who are scheduled and all students at the same time. Compared with the conventional classroom, the VC requires the presence of technology resources and psychological resources from teachers and from students. Although the concept of virtual learning comes as a new medium that can save travel costs, the separation between teachers and students also cause a negative impact, namely the lack of control over the attitude of the students during the learning process. To overcome this, it takes a selection of appropriate media and techniques in implementing the concept of virtual learning.

Selection of media in a virtual learning should be logical and instructive. Logic in cost, infrastructure, the needs of students and others, besides, the media must be educated so as to completion of an effective learning process that indicates a change in behavior as a result of learning.

2. Computer Layout

A classroom (computer lab) that has many computers is very useful when groups of students must use the same software simultaneously. The students can work in teams consisting of two or three students and shared using the computer, while teachers may have a projection device to display information for all students in the screen (Smaldino, Lowther, and Russell, 2011). So the computer layout should also be designed in accordance with the needs and the size of the existing space. A computer should design for two or three students, so that cooperation can occur between them in virtual learning.

3. Steps to Designing a Virtual Learning Model

In this article tried to design a virtual learning model using the ASSURE model (Analyze learner; State objectives; Select instructional methods, media and materials; utilize media and materials, Require learner participation; Evaluate and revise) presented by Smaldino, Lowther, and Russell (2011).

a. Analyze learner

   The first step in planning a virtual learning model on mathematics lesson is to identify and analyze the characteristics of students, adjusted for the results of learning. This information will greatly assist designers in designing virtual learning (in this case the virtual classroom). What is important in analyzing the characteristics of the students included the general characteristics of the students, who must possess the basic competencies of students (knowledge, skills and attitudes), and learning styles of students.

b. State objectives

   The next step is to state standards and learning objectives for math specific as possible. Within NETS for Students there are six Performance Indicators. Each Performance Indicator indicates and outlines what the student should be able to achieve within technological literacy by the completion of a school year. The Performance Indicators are guidelines where the students are aware of the programs goals and what they are attempting to achieve to meet NETS standards. The Performance Indicators are as follows: 1) Creativity and Innovation: Using creative thinking and innovative technology the students demonstrate and develop models and simulations to explore and identify complex systems and forecast possibilities as well as they use existing knowledge to generate new ideas and creative thoughts; 2) Communication and Collaboration: Students use digital media and

environments to collaborate, communicate and interact with other students, teachers and professionals. They also engage in a cultural and global awareness and contribute to project teams to produce original works or solve problems; 3) Research and Information Fluency: Students apply digital tools to plan, organize and gather information, in order to be able to inquire, analyze, organize and evaluate information; 4) Critical Thinking, Problem Solving and Decision Making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources; 5) Digital Citizenship: Students demonstrate personal development to be lifelong learners because they are aware of the human, cultural and social issues related to technology and they practice ethical and legal digital behavior; 6) Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems, and operations so they are able to select, transfer, understand and troubleshoot various systems and applications productively and effectively (Wikipedia, 2011).

c. Select instructional methods, media and materials

   This stage is to select the method, media and methods to be used. In virtual learning, it is to use a cooperative method of virtual classroom. This is useful for the interaction between students and students, students with the media, and students with teachers. The medium used is designed website offline (using the LAN / Intranet), this is done for loading the material faster than using the Internet that require a connection further. The material to be applied is a matter of mathematics that could be discussed further.

d. Utilize media and materials

   The following stage designer designing media that will be used to change media interactive website. Interactive learning materials designed so that students can be motivated in learning mathematics. Teachers in this case as facilitators, which motivates students verbally and non verbally (using media website). The work of students in the form of training, evaluation or questions and responses will be stored in the program created, to facilitate teachers to recap these students' work. To anticipate the shortage of computers in the classroom, a computer designed for two or three students. Learning strategy should also be designed using the cooperative learning method, so that students feel motivated by the presence of teachers in a virtual classroom.

e. Require learner participation

   The involvement of students actively indicates whether the media used effectively or not. Virtual learning must be designed to create activities that allow students to apply knowledge or new skills and receive feedback regarding the suitability of their business before and after learning. Provided training independently in each material is independent evaluations which may provide feedback. This feedback will be recorded automatically in the program, so that teachers can evaluate students' abilities.

f. Evaluate and revise

   After the media website is finished, first is to carry out an evaluation of media specialists, content experts, and other design experts. After that, revising step, proceed with evaluating the "one to one" to see the legibility of the media website. The evaluation is applied to students who have low

skills, medium and high. Next is the evaluation of small groups consisting of eight to twelve students. After that the media can be tested spaciousness website to see the effectiveness and efficiency of the media in virtual learning. Evaluation is done continuously until the medium used in virtual learning is considered effective and efficient.

Conclusion

Virtual learning for learning mathematics is one of the methods which can be implemented by combining the benefits of direct interaction and the use of virtual technology. Virtual learning can work well if the interaction and collaboration among the parties involved (i.e. teachers and students) to involve in a controlled and dynamic process. In practice, virtual learning offers a variety of techniques and tools of mathematics items that can be used to make interaction and collaboration during the learning process takes place. To maintain quality and control of the virtual learning process is started, the teacher should be able to choose the method and visualization tool for mathematical symbols right in order to maintain students' motivation to continue to contribute and interact with the material presented by the teacher. Teachers in this
case as fasilisator, which motivates students verbally and non verbally (using media website). The work of students in the form of training, evaluation or questions and responses will be stored in the program created, so that facilitates teachers to recap these students' work. Implementation of virtual learning in mathematics lessons offer very promising opportunities for the development of a new learning model that is more attractive, interactive, dynamic, hi-tech, and control.

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SOCIAL NETWORKING FOR TEACHING AND LEARNING

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Abstract

Social networking has influenced in the various dimensions of life. Revolution in communication between individuals will be used by an educator to the students so that students can find useful information in the online community as well as direct access to science whatever they want to know and explore. As the challenge is to utilize the social networking site to become a bridge to discuss and exchange ideas about many things. The concept of creative and innovative learning is the style of learning that combines theoretical, implementation in daily life and care about the needs and problems solving faced by the community.

Introduction

In relation with growing world , the advances in information and communication technology move more rapidly. In this era of globalization, as now, the internet has emerged as a major requirement for many people, because with the internet, every person, regardless of economic or social background, can access and find all information about many things from hundreds or even millions of resources available around the world. Easiness and low cost to get access to Internet cause the user grow up proportionally worldwide, including Indonesia.

Use of the Internet itself, is no longer limited to just looking for information, but has expanded to relation with social life as well as the world of business and economics. In education, the Internet also can be used. Especially after the era of WordPress that allows Internet users to have their own web site, now known as the term social networking or social network.

Indonesia itself, as one of the most populous developing country with a population in the world, has a reputation as a country with the largest Internet access of, especially in the use of social networking or social network. Therefore social networking could be used as one of teaching & learning methods in Indonesia more efficiently, specifically in higher level of education institutions such as university and college.

Discussion

Social networking or social network is a social structure which is developed of the nodes (which are generally individuals or organizations) are tied with one or more specific types of relationships such as values, visions, ideas, friends,etc. Research in various academic fields have demonstrated that social networks work on many levels, ranging from families to nations, and play an important role in

determining how to solve the problem, run the organization, and as the key indicator to measure the success of an individual in achieving its goals.

There have been various widely used social networking sites, like Friendster, Facebook, Hi5, MySpace, Plurk, Twitter, Tagged, and the local self-made such as FUPEI. Currently, to register as a member of a social network, it could be obtained easily. With internet, everyone in the world can communicate without any obstacles in space and time. Refer to Marshall McLuhan prediction in Understanding prophecy Media: Extension of A Man in the early '60s , stating that the development of communications technology will make the world as a global village (global village). This condition is formed from spreading of information rapidly and massive in the community, as well as very open and accessible to everyone. Now it's been proven. Global village explains that there is no longer clearly obstacle in time and place defined as in the old days. Information can be moved from one place to another world in a very short time, using Internet technology. McLuhan was also predicted that when the time comes, people will be highly dependent on technology, especially information and communication technology.

The power of social networking has entered into various dimensions of life. The more influence of social networks in this virtual world,could not be separated from the development of technology World Wide Web (WWW), which stepped into the era of Web 2.0, where the Internet technology easily accessible (open source) and allow all users to interact each other (two-way communication), and become involved in the changes of the digital world.

Seeing the reality that occurs due to the influence of social networks, this power can not be underestimated. Moreover, current information and communication is very open. Likewise, the mass media's role in transforming message of social networking to a wider audience. So the social networking sites have revolutionized the communication between humans.

With social networking and forums, an educator can make a group together with the student or students. It can help a student to find information in this online community and direct access to science whatever they want to know.

Currently, Indonesia is a social networking site users number one in Asia and the third in the world. It makes up (The next abbreviated to FB) as the most popular site in recent years with the access of more than 25 million users each day, and nearly 50% of users are young people aged 18-24 years and 60% female users. (Source: http://www.checkfacebook.com/, data, August 2010).
With this phenomenal influence, social networking has a lot more value where it can be used as a means of learning. The social networking such as Facebook helps learning process and increase the motivation to learn because it is familiar among students and university students. Facebook also can be utilized in the delivery of material.

Based on the statistical data above, it can not be ignored that the FB is a very unusual phenomenon at this time and as a challenge to make these social networking sites as a positive media, backed with physiological students who feel bored and tired when the learning process is not attractive and monotonous. Start on using FB ranging from online games, update the status of the funny and strange

followed by the comments, they make more frequent of using FB for hours even in the classroom by using a cell phone.

As a challenge, there is an opportunity to utilize the social networking site to become a bridge to discuss and exchange ideas about many things. Use of this social networking site would be one thing that is very interesting, fun and popular by the students to remember. They can still learn and discuss education and could also meet with his friends in cyberspace.

One event seminar ever held by an educator from the school of Al-Ghurabaa with the title "Face of The Book With Facebook" is one of the good example. Such this acitivity can enhance students' abilities and ideas of things they face in daily life, especially in school. Educators also requires the community to communicate in English, thus stimulates and familiarize students to write in English.

To make the program well established and controlled, the educational institutions must prepare the required tools to be able to create networks and computer labs so that students can access the Internet. That includes buying the device and make a appropiate computer lab for learning process. Then install computer equipment with Internet network that allows devices to be able to access the computer. The thing to consider is the capacity of electricity, the number of monitors and PCs are calculated for the number of students there.

With this innovative , creative, effective and efficient media, student is expected to be more independent and works well with a good understanding of learning materials. Prof. Johannes Surya quoted on one of the show on Metro TV that "There are no dumb students, just that those who do not get a chance to learn from good teachers."

To support these activities there is a demand to prepare qualified human resources and technology to master the technology, both existing and up to date. This led us as a successor of the nation to be prepared with any kind of effort to the mastery of information technology and communication.

Both Information and communication technology is necessary to get highly attention, especially in the education of young generation, because this technology both formal and informal must be mastered early on. Attention to the problem of educational system has been implemented by the government Indonesia with applying the subject of information and communication technology become a compulsory subject in junior high and high school.It was started and applied in 2006/2007 complete with the necessary facilities, such as computer and Internet networks. Facilities are in fact very supportive to learning process not only in communication & information technology but also on other subjects. It is very appropriate with the blue print of National Education of Indonesia in 2025 to produce a competitive human resources.

Based on the vision of National Education above and the availability of facilities and infrastructure that support the utilization of information and communication technology tools effectively and efficiently. Where it was clear the goal is to achieve the mastery of either existing technologies and advance technologies..It is necessary to develop towards the utilization of existing technology to create new

things that are useful for education as well as society. The problem that often arises is lack of computers in the educational institutions both formal and non formal to support learning process.

An experiment has been conducted by an educator at SMAN 1 Dawan Semarapura Bali in 2010 to students where the problem of frequent lack of computer facilities as well as unuseable computer. From several samples towards learning model provided to the students,concluded that, to overcome the problem of lack of computer or many unuseable computers , causing many students do not get the support facilities, then one of the proven solution of learning to get a good response from the learners is to make a mediawebsite which can be visited or accessed at any time by students to obtain complete information about learning materials that have been provided, or which will be discussed in the classroom. Of course the media website contains educational information specific to a lesson where TIK contains tutorials practical video on every material that can be downloaded for the learners to practice independently.

The Follow-up from video tutorials is of course accompanied with task that to be done by students associated with the content being discussed in the video lessons and will be demonstrated by students to the teachers during the next class. From this research we can conclude that this model is very helpful in supporting teachers 'students' ability to help the learning process and also make the work for the teacher a lot easier.

The other most popular social networking site is Twitter. Many people in Indonesia are part of 25 million people of the user of Twitter worldwide . Twitter users in Indonesia in general is demographically was born after 1990. They were raised by television, computers, internet, and mobile phones. This group is the generation that grew up when information technology is entrenched and become part of everyday life. They are digital native, natives of the digital age. On the other hand, teachers and lecturers were born in years 70 and 80's when technology was not so dominant. Most of the teachers are those who started after a rather mature technology, or Digital Immigrant. "Difference" is to separate the two generations between digital gap.

The greatest challenge for teachers in this era is to prepare students for future challenges that more complicated and growing fast. One way is to harmonize the wisdom and skills with technology that commonly used by students.

Applying technology in education, we could be stuck to the very end of the spectrum, ie 100% long distance learning, or opposed to the 100% face to face. For example, at the University of Gadjah Mada, the learning process which used is in the middle, or mixed models. This model is used in the midst of technology to enrich teaching and learning process. There are two things that can be enriched with the use of Internet technology and social media. First, teachers can utilize technology to enrich the learning materials. Narration in the class about the French revolution will generate more attention if it is equipped with photographs of the French that can be easily obtained on the Internet. Similarly, discussion of Biology can be enhanced with video that can be downloaded from YouTube.

Secondly, through the internet and social media, teachers can establish closer communication with their students. The Internet also allows the communication of teachers and students are not limited by space and time. Students who have questions at night can immediately ask the teacher. Because the question was thrown through social media, the learning process is no longer restricted to between teachers and students, but also between students and students. The Internet provides an unlimited space to share information. Infinity makes the process of seeking knowledge is more complicated and requires its own skills. To start the search for a topic, usually use Wikipedia (en.wikipedia.org), the largest encyclopedia in the world where the author are volunteers from various corners of the earth.

Like encyclopedias in general, the articles on Wikipedia is complete and up to date, although sometimes it is not deep. Therefore, Wikipedia is suggested as a starting point to research a topic. At the end of Wikipedia articles usually provide available links to other sites that describe the topic more deeply.

Please note that Wikipedia is written by hundreds of thousands of people. Although in general the information provided is accurate, but it's good to check the discussion to ensure there are no differences of opinion in the article. Wikipedia is also available in Bahasa Indonesia, although the completeness of the information is still far below the English version. From Wikipedia we usually find the term and additional topics. It can be used as material to be searched using Google (google.com). Ten search results from Google normally more than enough to enrich insights. Most of the information displayed Google sourced from news sites and blogs. If news sites are reputable enough to believe, the blog require special skills needed to sort out of quality content.

There are different kinds of blogs on various topics. Blog with titled “Tale of Geology” (Rovicky.wordpress.com) is a blog about the interesting geological phenomenon for the subjects of Geography. There is also a blog about physics demonstration which titled is “Cat Physics” (kucingfisika.com), here there are various kinds of videos to support the subjects of physics. Another interesting blog is the Action Master (aksiguru.org) that documented a variety of creative ideas in teaching teachers.

Other sites that can help teaching is YouTube (youtube.com) containing millions of videos on various topics. To help explain complex topics such as "miosis" teachers can use the video available here. There are also videos about the history, such as world wars videos, video speeches of Sukarno, and ancient video of Indonesia in the Dutch colonial period.

The gain of information technology is closer to humans, and this has been evidenced by the masive interactions on social networking sites that make people feel closer although never met in person. Two frequently used sites are Facebook and Twitter. Facebook came from sites that function is very comprehensive so it can be used to assist the process of teaching. Twitter is a microblogging site to disseminate information while conversing with students. Two of these sites have their uses respectively.

Facebook is more appropriate to form a community of learning and discussion. Here the teacher can upload photos, videos, and tasks. Teachers also can throw a quick question for discussion by students.

Twitter is similar to Facebook, but it is simpler and more real-time, Twitter is more appropriate to throw a quick question or where the students ask the teacher without having to be in the same place.

The question often arises whether the students may feel uncomfortable if the teacher is on social media sites? Here the teacher should learn the way of multinational companies to get closer to the customers on the internet. To make students comfortable interacting on the Internet, teachers must be a "friend" who spoke with the "language" of students. However, besides being a "friend" teachers also should be a "role model" or role-models for their students. So the question must reversed whether the teacher feel comfortable whe their activities on the internet can be seen clearly by their students. The solution is to make FB and Twitter account as secondary used to teach, so that online activities are not seen by the students. The concept of creative and innovative learning is the learning style that blends Theoretically, the application in daily life and to care about the needs and problems which is faced by the community. So in addition for the useful development of science itself, is also help to solve existing problems in society. By learning creative and innovative, students have experiential learning and life skill that will bring as supportive life.

Examples of creative learning are: socio-drama, lab work, field studies, case studies, scientific visits to companies or government agencies. Creative learning can be enriched by inviting students to research data on the Internet. Here the teacher plays a major role in guiding students to find information on Wikipedia, Google, and Blogs. Including the right sort of information and avoid misleading information.

Teachers also have a role that the students do not make mistakes on the Internet, such as giving full name, address, phone, photos, credit cards, or other personal data to strangers.

Conclusion

In addition to the limitations of supporting devices, the biggest challenge in applying the Internet and social media that is commonly encountered is the lack of teacher time to prepare the material. This can be anticipated by arranging the material slowly and regularly so that it will be accumulated to make a comprehensive learning materials. By utilizing the latest technology for teaching, we have been preparing students for a new era.

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APPLICATION OF SOCIAL NETWORKING IN EDUCATIONAL TECHNOLOGY

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Abstract

Education is a way to ensure the development and advancement of a nation be a strong nation and able to defend its sovereignty to be respected by other countries.

Social Networking itself to be so much in demand as a means to establish communication which had long constrained. So clearly here to see an opportunity where education is no need to be run in conventional media but many intermediaries who can assist the delivery of science.

Web based Social Networking services make it possible to connect people who share interests and activities across political, economic, and geographic borders. Through e-mail and instant messaging, online communities are created where a gift economy and reciprocal altruism are encouraged through cooperation

Educational technology is most simply and comfortably defined as an array of tools that might prove helpful in advancing student learning. Educational Technology relies on a broad definition of the word "technology". Technology can refer to material objects of use to humanity, such as machines or hardware, but it can also encompass broader themes, including systems, methods of organization, and techniques.

Social Networking and Education will focus on social networks that you may not have used before – rather than the highly popular sites like Twitter, LinkedIn, Facebook, YouTube, Slideshare and Wikipedia, which are of course still very useful for learning and development.

Keywords : (Times New Roman, 12 pt, italic) method, parameters

1 PRELIMINARY

1.1 Background

The development of current technology causes changes in human behavior in all aspects of social life and culture.

Education is a way to ensure the development and advancement of a nation be a strong nation and able to defend its sovereignty to be respected by other countries.

Advances in technology and its impact on the education system can be seen clearly on the use of Social Networking within the scope of personal between educators and learners. Where, the limits of space and time in delivering science and knowledge is no longer a barrier.

Call facebook, twitter, multyply, youtube, myspace and more general Social Networking currently be heard has been accessed by thousands pairs of eyes. if observed carefully, this potential should be a door opener of educational technology alternatives that can maximize the conventional educational technology.

Social Networking it self to be so much in demand as a means to establish communication which had long constrained. So clearly here to see an opportunity where education is no need to be run in conventional media but many intermediaries who can assist the delivery of science.

The more easy it is to transfer knowledge from educators on learners will further maximize the end result of a learning process.

In this paper, expected a new innovation on the symbiotic mutualism between Social Networking and the world of education can be designed and developed into something useful for others.

1.2 Problem Formulation

Problem formulation of the paper is

"what the extent Social Networking functions to the development of education?"

1.3 Problem Limitation

The discussion is limited to educational technologies involving Social Networking

2 DISCUSSION

A Social Networking is a social structure made up of individuals (or organizations) called "nodes", which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige.

Social Networking analysis views social relationships in terms of network theory consisting of nodes and ties (also called edges, links, or connections). Nodes are the individual actors within the networks, and ties are the relationships between the actors. The resulting graph-based structures are often very complex. There can be many kinds of ties between the nodes. Research in a number of academic fields has shown that Social Networkings operate on many levels, from families up to the level of nations, and play a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals.

In its simplest form, a Social Networking is a map of specified ties, such as friendship, between the nodes being studied. The nodes to which an individual is thus connected are the social contacts of that individual. The network can also be used to measure social capital – the value that an individual gets from the Social Networking. These concepts are often displayed in a Social Networking diagram, where nodes are the points and ties are the lines.

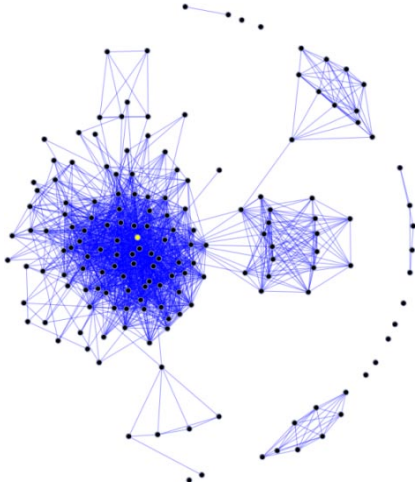

Figure 1. Social Networking

Web based Social Networking services make it possible to connect people who share interests and activities across political, economic, and geographic borders. Through e-mail and instant messaging, online communities are created where a gift economy and reciprocal altruism are encouraged through cooperation. Information is particularly suited to gift economy, as information is a non-rival good and can be gifted at practically no cost.

Facebook and other Social Networking tools are increasingly the object of scholarly research. Scholars in many fields have begun to investigate the impact of Social Networkinging sites, investigating how such sites may play into issues of identity, privacy,social capital, youth culture, and education danah boyd, (2007), Why Youth (Heart) Social Networking Sites, MacArthur Foundation Series on Digital Learning - Youth, Identity, and Digital Media Volume (ed. David Buckingham).

2.1 Education Technology

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources." The term educational technology is often associated with, and encompasses, instructional theory and learning theory. While instructional technology covers the processes and systems of learning and instruction, educational technology includes other systems used in the process of developing human capability. Educational Technology includes, but is not limited to, software, hardware, as well as Internet applications and activities. But there is still debate on what these terms mean.

Educational technology is most simply and comfortably defined as an array of tools that might prove helpful in advancing student learning. Educational Technology relies on a broad definition of the word "technology". Technology can refer to material objects of use to humanity, such as machines or hardware, but it can also encompass broader themes, including systems, methods of organization, and techniques. Some modern tools include but are not limited to overhead projectors, laptop computers, and calculators. Newer tools such as "smartphones" and games (both online and offline) are beginning to draw serious attention for their learning potential.

Those who employ educational technologies to explore ideas and communicate meaning are learners or teachers.

Consider the Handbook of Human Performance Technology. The word technology for the sister fields of Educational and Human Performance Technology means "applied science." In other words, any valid and reliable process or procedure that is derived from basic research using the "scientific method" is considered a "technology." Educational or Human Performance Technology may be based purely on algorithmic or heuristic processes, but neither necessarily implies physical technology. The word technology comes from the Greek "techne" which means craft or art. Another word, "technique," with the same origin, also may be used when considering the field Educational Technology. So Educational Technology may be extended to include the techniques of the educator.[citation needed]

A classic example of an Educational Psychology text is Bloom's 1956 book, Taxonomy of Educational Objectives. Bloom's Taxonomy is helpful when designing learning activities to keep in mind what is expected of—and what are the learning goals for—learners. However, Bloom's work does not explicitly deal with educational technology per se and is more concerned with pedagogical strategies.

According to some, an Educational Technologist is someone who transforms basic educational and psychological research into an evidence-based applied science (or a technology) of learning or instruction. Educational Technologists typically have a graduate degree (Master's, Doctorate, Ph.D., or D.Phil.) in a field related to educational psychology, educational media, experimental psychology, cognitive psychology or, more purely, in the fields of Educational, Instructional or Human Performance Technology or Instructional (Systems) Design. But few of those listed below as theorists would ever use the term "educational technologist" as a term to describe themselves, preferring terms such as "educator".[citation needed] The transformation of educational technology from a cottage industry to a profession is discussed by Shurville, Browne, and Whitaker.

2.2 Education Based Information and Technology with Social Networking

Social-networking tools aren't just for flirting on MySpace. The evolving world of Internet communication -- blogs, podcasts, tags, file swapping -- offers students radically new ways to research, create, and learn. But, too often, schools use computers as little more than glorified workbooks, and that's criminal, says Chris Lehmann, principal of Philadelphia's Science Leadership Academy. He explains why teachers should embrace networking and how they can use it to improve education.

It's software that allows people to come together around an idea or topic of interest. A school could use blog software to bring together anyone who's writing about politics or computing or Greek literature.

Schools should reflect the world we live in today. And we live in a social world. We need to teach students how to be effective collaborators in that world, how to interact with people around them, how to be engaged, informed twenty-first-century citizens. We need to teach kids the powerful ways networking can change the way they look at education, not just their social lives. We don't talk enough about the incredible power of social-networking technology to be used for academic benefit. Let's change the terms. Let's not call it social networking. Let's call it academic networking.

A teacher can set up kids with accounts at the Web site Delicious, which lets you store, organize, and share links -- for example, an annotated resource list you use on a project. You can also see links other people have saved, or browse to see what everyone has bookmarked on a subject. It's simple. You don't need your own server. Any teacher with a computer and an Internet connection can use it.

You teach! You have frank discussions. You show them examples and ask them to make ethical decisions. You ask: What does it mean that fifteen-year-old kids are calling themselves nineteen and posting racy pictures online? What does it mean that college kids are posting raunchy spring break pictures that a prospective employer can find? The idea that we are the stories we tell has never been more important. Schools have always taught kids how to present themselves -- that's why we did oral presentations in the classroom. Now we need to teach them to present themselves electronically. That's why it's so scary to lock these technologies out.

Administrators have to facilitate change. A lone teacher can do it, but it's hard to sustain. Administrators have to decide this is valued for the whole school community, and they have to give teachers time and freedom to learn, experiment, and play. Lots of teachers are doing it on their own, but it can be exhausting. That's classroom 2.0, not school 2.0.

2.3 Social Networking and Education

This Paper will focus on social networks that you may not have used before – rather than the highly popular sites like Twitter, LinkedIn, Facebook, YouTube, Slideshare and Wikipedia, which are of course still very useful for learning and development.

1. Elgg: Elgg is an open source social networking platform which allows you to create social networks, blogs, microblogging, RSS feeds and group forums. It’s highly flexible and fairly easy to use and customise. There’s a good Guardian article explaining what you can do with it if you’d like to learn more about the possibilities.
2. Teambox: Teambox is also open source software, but it focuses on project collaboration. It is often described as ‘Twitter for project teams’. If you’re looking for something like this then Teambox is highly recommended; it’s quick to set up, simple to use and you won’t need to download anything.
3. Training Zone: You will need spend a minute signing up to access most blogs, but this online network for training professionals cannot be beaten. You can use it to keep up-to-date on training

developments and issues, to network with other trainers, or to build your own online presence by filling in your profile, blogging and talking with the community.

4. eLearning Learning: This website aggregates all the latest learning, training and development news and blog posts on the web. It also lists its sources in a right-hand side column should you wish to check out learning and development blogs. If you blog in this area and would like to be listed you can even submit your blog for consideration by email.
5. Businessballs: If you're ever in desperate need for readymade business training resources, then Businessballs should be your first port of call. You'll find articles and tips on dozens of subjects, quizes and adaptable group exercises or games. There's also a community, but the amount of spam makes Training Zone a far better option for networking.
6. Langled: If you wish to learn a language then free social network Langled is a really useful tool. It offers tests and interactive online courses for popular European languages such as French, German, Spanish, English and Italian. You can also find and chat online with language exchange partners.
7. Study Curve: Study Curve is an up-and-coming social network with a clear interface that Facebook users will find easy-to-use. You can use it to create your own study groups around a particular subject or benefit from existing groups by finding answers to your questions. Useful for students as well as professionals.
8. If you know a great learning and development resource that we should include we'd love to know about it – just leave a comment below.

3 CONCLUSION

With a variety of theories about education based on information technology, it was found that there was a clear relationship between the development of social networking and advances in educational technology.

Social network was able to create a learning environment that is not limited by space and time, so that there will be no significant obstacles that may hinder the activity or process of knowledge transfer.

Some examples of the application of educational technology by making use of social networking among others,

- Create a blog that contains a variety of learning materials.
- Open communication and networking forum to facilitate exchange of information.
- Utilize social networks to deliver relevant information.
- create groups and accommodate development in a social network that can be used by other parties

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TEACHING AND LEARNING THROUGH SOCIAL NETWORKING IS A STRATEGY WITH TECHNOLOGY

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abstract

The development of information and communication technology has been used for many purposes, ranging from household, business, public service, government, to education. These conditions provide opportunities for education to use computers and information technology (IT) as a means to improve the quality of teaching and learning in schools. Acceleration technology is also prevailing in the world of education. We can pay attention to the techniques of learning innovation that exist in Indonesia today's educational world, this is one of the twisted growth of knowledge is happening in the world of education.

Social networking is a grouping of individuals into specific groups. Social networking can take place in person because of places like work, universities, and high schools, but it is most popular online. Online social networking uses websites that help people communicate via messaging, chatting, and sometimes voice capability or video chatting. Social networking is like a community of internet users.

Some strategies shared in the realm of teaching and learning with technology focused on reorganizing technology support resources to create new partnerships within the technology organization, with the goal of developing a community of support for instruction. One institution developed a strategic plan that created tactical partnerships within and beyond the IT unit. The purpose for creating these new partnerships and collaborations was to generate faculty perceptions of the IT support unit as cohesive and unified (and ultimately offering better support than in the past), rather than as separate silos of support. They set up a front-door support system for walk-ins and referrals, a creative services department for project management, and a training development department. They also partnered with their Center for Advancement of Teaching and Learning, actually merging their website presence.

A critical element of this transformation was deploying their instructional designers, who were distributed in each area, to ensure that pedagogy drove the technology used. They removed their "faculty lab" and created a "commons" so that faculty could come in and

discuss their projects in a comfortable setting. Basecamp software, which was used for project management, was invaluable in managing projects using web-based tools.

Keywords: Teaching and Learning, Social networking, Strategy and Technology

1.Introduction

The development of today's technology has increased very rapidly, this is something that inevitably should be followed, if necessary, should be accelerated even faster for our generation not be a plagiarist or generation consumer generation. Generation accepted technological development is now capable of creating tremendous information explosion.

The development of information and communication technology bnerlangsung so quickly has been used for various purposes, starting with the household environment, many companies, public services, government, to education. Of course, these conditions provide opportunities for education to use computers and information technology (IT) as a means to improve the quality of teaching and learning in schools. Acceleration technology is also prevailing in the world of education. We can pay attention to the techniques of learning innovation that exist in Indonesia today's educational world, this is one of the twisted growth of knowledge is happening in the world of education. Teachers are required to become a leader in the mastery of technology as an accelerated form of absolute knowledge must be transferred to succeeding generations.

The most important thing to do from now on is to improve the quality of teachers, educators and education personnel to be able to offset the development of technology and information, for the noble purpose of education can be achieved in a short amount of time. While this is important for teachers to teach with technology. Current conditions are apparent in some schools have implemented the teaching and learning that uses the help of electronic tools to deliver content of the material taught. Electronic tools in this case is electronic media which is used from the LCD, computers, internet, intranet, satellite, tape / video, interactive TV and CD ROM. Apart from electronic media tersebuit no less important in the utilization of IT in the learning process are the teachers / lecturers / educators who teach at various levels pendidikan.Selain multimedia devices that are used in the classroom to teach, even outside the classroom teacher can use the Internet media , such as websites, blogs, or email.

Teacher / lecturer and educator who is one of the most important part in the learning process requires a variety of tools to optimize the utilization of IT to support the necessary capabilities, especially in IT devices such operations. Various research results show there are still many teachers who have not been able to operate the computer in terms of access to information and its use in the learning process. The requirement of teachers in encouraging and supporting students towards creative use of IT

absolutely executed. For that role of teacher is needed for balance control and packaging information will be confronted and presented to students. Because there is the likelihood the student has to understand more a problem of the teacher.

Lecturers and teachers state that a large part are still not able or optimal, utilizing advances in information technology. With the word is mentioned as the state of technology illiterate. This should look for the best solutions to promote education in Indonesia, which can be facilitated by education policy makers.

Based on the above preliminary course there are some questions to be answered through further discussion, namely: a) whether the education world is ready to enter into the world of social networking? b) How important teachers / lecturers / educators in the master information technology? and c) How helpful to the internet in this regard is social networking as a learning resource?

2.Discussion

2.1 Readiness for Education

Teaching and learning process is the core of the entire educational process with teachers / educators as major stakeholders. Teaching and learning process is a process that contains a series of activities teachers / educators, and students / learners on the basis of reciprocal relationships that take place in educational situations to achieve a particular goal. Teaching and learning activities is a system consisting of various interrelated components to one another and is an inseparable unity. Including teaching and learning components such as instructional objectives to be achieved, subject matter, teaching methods, teaching aids and evaluation as a measurement to determine whether the purpose is achieved.

According to Dick and Carey[1], there are three kinds of instructional activities: a) the first teacher as a facilitator and student self-learning, b) both faculty and students as a single source to learn from them, and c) the three teachers as a presenter dipihnya learning materials or potential improvements. Any forms of instructional activities above require different instructional materials.

The development of instructional materials for students to learn independently, or instructional material that forms the first instructional activities that teachers as facilitators and students to learn independently. The form of this instructional activity is also called self-learning (independent learning). On self-learning instructional activities students use learning materials designed specifically. Material is learned without being dependent on the presence of teachers. Types of learning materials can be one or ombinasi of media programs, print materials, films, audio tapes, radio programs, slide shows, video programs, television, computers, and others.

[1] Walter Dick and Lou Carey, *The Systematic Design of Intruction*. 2nd. (Glenville Ill: Scott, Foresman and Co., 1985), p. 178.

To form a self-learning activities, instructional developers should develop self-learning materials are usually called modules, in this study in the form of an electronic module which is better known as e-learning. Self-learning materials in addition to use in distance learning systems, can also be used in a regular classroom. It's just that when used in regular classroom role tutor / facilitator is very great for learning to work well

The use of self-learning material has some advantages and some disadvantages. Advantages mmenggunakan self instructional materials: a. Teaching costs are not expensive, because it can be followed by students who are many in number, b. Students can progress according to their velocity, c. Direvieu and learning materials can be revised gradually, section by section, to overcome the things that is confusing or unclear, d. Students receive regular feedback in the learning process, because it has terintegrsi in learning materials studied. In addition to the excess use self-study materials there is also shortage using self-learning materials are: a. High material development costs and long preparation time, b. Demanding high learn discipline that may be less possessed by students in general and students who are still immature in particular, c. Fsilitator requires hard work to continually monitor students' learning process, motivating and consulting on an individual basis.

The form of this self-study activity is appropriate when used un tuk Solution: a. large number of students, b. teachers are few in number, c. available power that many developers and d. keampuan and characteristics of a heterogeneous student.

In the above description can be concluded that the type of instructional materials are developed depending on the form instruksioal activities to be performed. On self-learning materials consist of instructional materials learning materials that will be used by the student, student guidance, and guidelines for teachers including testing. Some materials; learn mandiiri dikembangkamn when the instructional activities students are learning independently, without being dependent on the presence of teachers. Imnstruksional material that is his teacher.

It can be concluded with the concept of independent learning there is no problem with the use of social networking with education. Although many are cons but if used in accordance with the needs of course no problem.

Social networking is the grouping of individuals into specific groups. Social networks (Social networking) can take place due to a common place, such as places of work, universities and high schools, but the most popular is called with online. Online social networking use website that helps people communicate through messages, chat, and sometimes the voice or video chat capabilities. Social networking is like a community of Internet users. Most users sharing common interests in hobbies, religion, or political. Social networking sites allow you access to other member profiles and allow you to contact them.

When viewed from the work process soaisl networks comprising a) joining the social networking site, b) invite people to join and also be invited to join, and c) the process of adding and joining with new people. Lots of social networking sites that exist in the world famous and much in demand are:

Facebook, MySpace, hi5, myyearbook, Meetup, LinkedIn, ning, MyLife, friendster, myheritage, multiply, orkut, nexopia, xing, tagged, classmates, bebo, FriendWise, FriendFinder, Yahoo.

2.2 Information Technology in Education

Information technology is a process of development of techniques, methods and media of communication to exchange information on human antyar. At first people exchanging information through language. Through language others can understand what information we submit. With a language people can receive information but the information conveyed tersebutsanagatlah coverage is limited both in space or time. Information Technology (IT) is the acquisition, processing, storage and dissemination of information on vocal, pictorial, textual, and numeric with a combination of computer-based microelectronics and telecommunications. [1] The term in the modern sense first appeared in an article published 1958 in the Harvard Business Review, in which the author Leavitt and Whisler commented that "new technologies do not have a single established name. We'll call it information technology (IT)." [2] IT is the field of technology management and in the broad sense is not limited to things like processes, computer software, information systems, computer hardware, programming language, and construction data. In short, anything that makes data, information or knowledge that is felt in any visual format, through a distribution mechanism for multimedia, is considered part of the domain space is known as Information Technology (IT). Information Technology (IT) is the driving factor in the globalization process. Improvements in the early 1990s in computer hardware, software, and telecommunications greatly enhance the ability of people to access information and economic potential. This progress has facilitated increased efficiency in all sectors of the economy. IT drives the use of innovative resources to promore new products and ideas, in all nations and cultures, regardless of geographic location. Creating efficient and effective channel for exchanging information, IT has become a catalyst for global integration. IT (information technology) is a term that covers all forms of technology used to create, store, exchange, and use information in various forms (business data, voice conversations, still images, moving images, multimedia presentations, and other forms, including they are not yet understood). It's convenient term for including telephone and computer technology in the same word. It is a technology that encourages what is often called "information revolution.". For more details, the following description will discuss about the functions of Information Technology, and its use.

2.3 Technologi Information

Information Technology based on its function is divided into three:[2]

- Information Technology Systems which is attached (IT Embedded Systems), namely information technology systems embedded in other products. For example; Casette Video Recorder (VCR) have IT systems that allow users to record television shows.

[2] Lantip D Prasojo dan Riyanto, *Teknologi Informasi Pendidikan* (Yogyakarta: Gava Media, 2011), pp 70-84..

- Specialized Information Technology Systems (Dedicated IT System), a system designed to perform specific tasks. For example, ATM (Automatic Teller Machine) made specifically for conducting transactions between banks and customers.
- Technology Systems that are designed for various public purposes (Multi Purpose IT System), such as portable PC (Personal Compute) r. With this PC one can perform any activity in accordance with their respective keperluannya. For example, for administration, financial accounting, game or games and others.

The development of such technologies has been discussed previously also affected the education world, which can be seen from the emergence of innovation and creativity in the delivery of teaching materials to the participants teach.

There are several concepts underlying the usage of information technology for educational activities, and some already widely adopted in college. The use of this technology has direct and indirect impact on the way to provide education that leads to improved quality of human resources.

These concepts include the following:[3]

- As a Media Simulation
- The use of information technology to assist educators in organizing the learning process, mainly used as a means of drawing / illustration of the lesson is being taught so that learners get a clear picture of the relationship between theory and fact. Program applications that are often used for this purpose are: Simulation Game, Multi-media presentation, Interactive Case Study, and so forth.
- Course Management.
  Course management is the use of information technology to help teachers and students in conducting interaction, cooperation, and communication for the organization of a class with a specific teaching subject.With the help of network applications (Web), then all the tasks, homework, and other tasks can be done by downloading from a particular site addresses that are considered relevant.
- Virtual Class
  This technology allows for the virtual classroom or virtual class. This virtual classroom is the operation of the learning process from a distance by using some special software which is connected via the Internet. One one of them is with a Video Conference technology.
- Computer Based Training (CBT)
  This concept is considered most effective in applying the system of independent learning. In this way a learner can find different sources of literature teaching eye they need from the Internet. Sources of existing literature on the internet are very few in number, far exceeding the capacity of existing libraries in schools in general.

[3] *Ibid*, pp. 178-208

Besides that, the learners can learn something from some of the software is deliberately designed to provide convenience for someone in studying something that you want learned. For example, how to create animations, how to make your Web site pages (Web Site) and so forth.

- Knowledge Portal.
  Knowledge Portal (Knowledge Portal), is a collection of website addresses that have a variety of reverensi from various disciplines. Someone searching for information about one of the disciplines, can easily access it directly through this portal. Therefore, the existence of this portal is very helpful to educators and learners in an effort to develop science and knowledge he had.
- Cyber Community
  The word comes from the word cyber cybernetic, that is how to control remotely. So the word has a connotation of cyber existence of "control" and "long distance". Lately, the word cyber is more associated with the presence of Intenet. Therefore we know of some of the terms preceded by turmoil "E-". For example, the E-Banking, which means all activities conducted through Internet banking. E-Commerce means trade activities that run through the Internet, including in it the E-Learning, which means that all the learning activities which run through the role of electronic technology products including the use of the Internet.

2.4 Strategies of Teaching and Learning with Technology

Some common strategies in teaching and learning with technology focusing on the reorganization of the support technology resources to create new partnerships within the technology organization, with the aim of developing community support for instruction. One institution developed a strategic plan made tactical partnerships within and outside the IT unit. Aim to create a new partnership and cooperation is to generate the perception of faculty IT support unit as a cohesive and integrated (and ultimately offer better support than in the past), rather than as separate silos of support. They set up a support system for the front door to walk-ins and referrals, creative services department for project management, training and development department. They also partnered with them Advancement of Teaching and Learning Center, actually merging their web site presence. Important elements of this transformation is to spread their instructional designers, who are distributed in every region, to ensure the pedagogy that drives the technology used. They removed "laboratory faculty" them and create a "commons" so that faculty can come and discuss their projects in a comfortable atmosphere. Basecamp software, which is used for project management,is very invaluable in managing projects using web-basedtools

Structuring what is traditionally known as "academic computing" has been happening more and more. In another session, the presenter said that 38 percent of the academic computing department reorganization in the last two years (although much has been entered by the other departments, such as

libraries or IT). However, the special reorganization has the goal of building community with the "clients" and allows them to respond more quickly to the needs of faculty, while serving as a partner rather than silo support. Although the two units mentioned in this session has a slightly different mission, most of their missions together, creating opportunities to partner and presentation of the presence of synergistic support for teaching and learning. Creating or changing the organizational structure that integrates IT, faculty development, library, campus support services and emphasized the shared responsibility to provide the various elements of support to faculty, helping them to work in a technology environment while maintaining an emphasis on learning.

2.5 Benefits for Students and Teachers / Educators

Benefits for Students:

- Increased ability in technology
- Increased exposure to diverse views
- Development of communication skills
- Increased ability to work on group projects
- Many students who are already using other forms of technology, so that they may be more involved if the study if they utilized
- Students can develop a positive image of themselves by putting the best quality out there

Benefits for Teachers and Schools:

- Cheap and effective way to convey information to parents and get the word out of school and events
- Can reach parents who can not come to school
- Able to form partnerships with schools in other states or countries
- Collaborate with other teachers
- Exchange lesson plans and information
- Improved access to resources

Benefits for students:

Social networking helps students connect and keep in touch with each other. Students are able to communicate with each other about school work, group activities, and for older students, the possibility of college. need in-text citation - also make sure the full bibliographic information.

Development of communication skills

Social networks provide a communication tool that allows students to communicate almost instantly, whether local or global. Most researchers agree that some text-based social networking services, which promote literacy skills, including interpretation, evaluation and contextualization ("Young People").

Improved skills in technology

Students develop an interest more toward using a technology such as: edit and customize the content, design and layout ("Work Education"). Some students use technology in different forms everyday already so they will be happy to use them in the learning environment.

Increased exposure to the varied views

Students are more open to new ideas and opinions of others when using social networking. Come into contact with the varied viewpoints are very important and useful, it allows students to have their voice heard and hear the viewpoints of their comrades and to form their own opinions about certain issues. need in-text citations.

Creativity

According to many researchers, including Ruth Reynard, Creativity in learning to develop ownership and new applications for student learning. So when students manipulate the software environment for purposes other than their main goal, students demonstrate the level of creativity that can be integrated into the learning environment and work to their advantage. need in-text citations

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MOBILE MULTIMEDIA DEVELOPMENT: CREATING COLORING GAME TUTORIAL

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Abstract

This paper is intended to develop a mobile multimedia, especially a Coloring Game Development Tutorial for a Flash Scripting course. This tutorial should encourage student's ability to integrate all information resources from mobile multimedia to develop a coloring game application. The tutorial focuses on how learners can develop a coloring game application following the instructions on the mobile multimedia. Each lesson is provided with a step-by-step instruction for creating a specific task. Learners can follow the tutorial from beginning to the end, or do only the lessons that correspond to their interests and needs. This research consists of 6 steps such as concept, design, obtaining content material, assembly, testing, and distribution. During the assembly step, the overall of the project is built, the tutorial is assembled, and any interactive features are built. The tool for this stage of authoring is Adobe Flash. During the testing step, the application is run and checked to confirm that it does exactly what the author has intended and the students can learn to make a coloring game by studying the tutorial on the mobile multimedia.

Keywords : learning, multimedia, game, mobile device, ActionScript

1 Introduction

Learning is a necessity in life, since his birth till the ends. As a human, we learn to be able to achieve our independence and to adapt to various environmental changes [1]. Nowadays, due to globalization and proliferation of technology, computer education in Indonesia becomes great demand for students. One favorite subject in computer education is multimedia technology using Adobe Flash software, which is now held in many courses as main and optional subject. Flash Scripting course is a one of the courses at Universtas Multimedia Nusantara, while Coloring Game topic using Adobe Flash software, sample of Game Development, is part of Flash Scripting course which was held at the tenth session of the fifteen attendance. While the same course named Multimedia is held in computer education at other universities, and Game Development is part of Multimedia course.

One of the multimedia application is a computer game. A computer game is a game played on a personal computer, rather than on a video game machine. Computer games have evolved from the simple graphics and game of early games to a wide range of more visually advanced games [2].

According to Mohler, computer game can be developed with Adobe Flash including timer, feedback, and score [3].

Rapid development in ICT (Information Communication Technology) has changed lifestyle today, including in learning method. There are several learning methods that apply ICT such as computer-based learning, e-learning, distance learning, etc. All information can be launched through computer and mobile device. Computer-based learning implementation in the learning process using multimedia increases student's creativity and innovations.

This study aims to develop a multimedia application particularly coloring game development tutorial on mobile device, which is a part of the Flash Scripting course. This learning model can be used by students in the computer laboratory, at home or the others. By studying the learning materials on mobile device, it is expected to enhance students to make particularly a coloring game and develop generally multimedia applications. Making a coloring game is one of the competency needed to be a multimedia programmer.

1.1 Multimedia

Multimedia is a combination of text, images, sound, animation, and video delivered via computer or electronic and digital equipment [4]. Using together multimedia elements such as images and animation that are equipped with sound, video clips, and text, will be able give clear meaning to those who need it. Vaughan stated that multimedia can bring radical changes in the learning process, from passive student learning to active student learning.

The word multimedia is a combination derived from multiple and media [5], and define digital multimedia is a combination of text, graphic (still and animated), sound, and motion video delivered to the user by a computer. The computer is an intrinsic part of multimedia. All these elements - text, graphics, sound, and video - are either computer-generated or transmitted through a computer. Multimedia systems are used in education, presentations, information kiosks, and gaming industry. The power of computer allows users to interact with the programs. Since interactivity is such a powerful concept, many experts in the field of multimedia consider interactivity as an integral part of multimedia.

In a multimedia system, if the user has the ability to control the delivered elements and timing, the system is called an interactive system [6]. There are different devices to provide end-user interactivity. Almost all tools today support the use of keyboard and mouse, button, and even touch screen. Buttons are on-screen objects that will produce some response when the end user clicks the mouse or touches them. The pushbutton control in Windows dialog boxes is an example of a button. Authoring of buttons involves defining the button appearance on screen, the location, and the action when clicked. Assembly tools that support buttons will provide features to do all three things.

1.2 Mobile Multimedia

When computers and software are used so that students have new methods of learning curriculum, these tools can promote and enhance students' understanding of content in powerful ways. They can find information, use images and sound as well as text to communicate what they have learned. The

explosive growth of mobile devices is stimulating widespread efforts to clone almost any technology. developed for desktop computers to mobile devices [7]. Mobile technologies offer the opportunity to embed learning in a natural environment. Mobile devices such as smart phones are becoming widely used on schools, and as the shape of computing is evolving more into a mobile environment.

According to Blue_Chi [8], making rich media for mobile consumption has never been easier since the release of the Flash Lite Player for mobile devices. We can make a vector graphics game that could be played on any device regardless of its operating system or screen resolution easily as long as that device is equipped with the Flash Lite Player - and lets not forget that we can play that game on a PC as well without using any emulator because the file is still a Flash movie that could be played on the Flash Player.

1.3 Coloring Game

Yahya [9] argued that most of preschoolers love to coloring pictures because it gives them a chance to control something and to express themselves. Coloring pictures is done by children using pencils or crayons on paper. Lately, coloring game can be played on computer using mouse to select the color, then drag to the images to be colored. According to Turner [10], game creation requires creativity and programming skills. Creativity can be seen in the form of the coloring objects, animation, timer, and others. The coloring objects can be created from a simple square to complex shapes such as polygons with curved lines. Filling the part of an object with color need a computer program that is called code.

Coloring game that runs on a computer is a simple game, i.e. click one of the buttons with mouse to select color, and then click a specific part of the image. Figure 1 shows some of the pieces of the image, and some color buttons to be selected, as can be seen in Figure 1.

Figure 1: Sample coloring game that runs on computer

1.4 Coloring Game Development Tutorial

Coloring game development tutorial can be run on a mobile device, presents how to make images, buttons, coloring pieces of image, and create the timer, feedback, and score. Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems, designing, implementing, evaluating, and managing solutions to the problems involved in all aspects of human learning [11]. All the efforts in educational technology are intended to facilitate learning and problem solving learners, that consists of management and development of learning systems by utilizing learning resources. Based on understanding of learning development, it needs at least four criteria in the learning model are: (1) has objective, the tutorial is used to support learning for studying by student to make coloring game that will be run on computer; (2) harmony with the objectives, all lessons in the tutorial is focused in making multimedia application particularly coloring game; (3) systemic and systematic, students have to learn what they need step-by-step; and (4) has the evaluation activities by students understand to learn from the tutorial and evaluation of the games that are made by students.

To create a coloring game with Adobe Flash, some activities should be done: (1) Make some vector images and dividing each image into several pieces which can be colored, then put it into the stage, (2) Create some buttons with ActionScript accompanied by different kind of color representing the color choice which will be used coloring images on the stage, (3) Create an animated title and some graphics with color effects, (4) Create a timer with script that is needed, (5) Make feedback that tells to the player weather he or she succeeds or fails to play the game, and it is provided with sound effects

accompanied by applause and the other form, and (6) Make score to calculate the score that is achieved by a player in the game [12].

2 Method

This section presents the method of tutorial development in creating coloring game and testing that is used in this research. This research uses Multimedia Development Life Cycle (MDLC) [13]. Authoring is somewhat like making a feature film, a movie, and there are many steps to the process. Multimedia Development Life Cycle, a typical multimedia systems development, may involve the following six major steps as follows:

1. Concept. The objective for the project is defined, and the type of the application is specified. In the film production, this is the stage at which the producer decides the kind of application to take and the subject to be.
2. Design. This is the process of deciding in detail what will be in the project and how it will be presented. This stage includes script writing, storyboarding, making navigation structure and some design steps.
3. Obtaining content material. During this stage all the data, audio, video and images for the project are collected in appropriate digital formats. In the course material, this would be the production stage, where all the scenes for the multimedia application are set up.
4. Assembly. In this step, the overall of the project is built, the tutorial to make coloring game is assembled, and any interactive features are built. The tool for this stage of authoring is Adobe Flash, and the tutorial is run on a mobile device.
5. Testing. During testing, the application is run and checked to confirm that it performs exactly what the author has intended. We have performed our experiment in two phases, preliminary testing and main field testing. At the preliminary testing, the mobile multimedia is tested on variety resolutions, interactivity tools of mobile devices. At the main field testing, the subjects research for implementation of the tutorial are students who learn the tutorial.
6. Distribution. In this step, the application is reproduced and delivered to students for their use. The distribution can be form application files that can be run on a mobile device.

The object of the research will be the development of multimedia application tutorial on mobile device particularly coloring game. The research location will be conducted at Faculty of Art and Design Universitas Multimedia Nusantara, Jakarta. Respondents consist of students who are studying Flash Scripting course. After they have learned to make coloring game from resources on the mobile multimedia, they create coloring game that will be evaluated by lecturer. This research is conducted six steps, but it is done until fifth step. The last step Distribution, dissemination at all universities in Indonesia, is not done this time, because the objective of mobile multimedia development is supporting learning process for students at Universitas Multimedia Nusantara.

3 Discussion

Mobile multimedia is developed to be a tutorial in creating coloring game. Developing the mobile multimedia involves some steps as follows:.

3.1 Concept

To illustrate how to develop mobile multimedia that contains creating coloring game tutorial in Adobe Flash, the first step is to define the learning objectives [13]. The learning objective is to encourage students develop multimedia application, particularly coloring game with Adobe Flash. The tutorial on mobile multimedia has to support learning that cannot be completed in class. Mobile devices that are provided with touch screen or keypad as interactive tools can be used tu ron the application.. The tutorial involves many topics such as multimedia, Adobe Flash, game development, creating graphics, animation, and ActionScript coding.

3.2 Design

The second step is developing a navigation structure and storyboard of the creating coloring game tutorial. First, it establishes lateral thought processes, helping to break down the navigation structures that are usually embedded in traditional approaches to course delivery. Second, it can result in an overview based on quite abstract design, which in turn generates fresh implementation. Third, it provides a storyboard for identifying relationships between the components.

3.3 Obtaining Content Material

The third step is obtaining content material. During this stage all the data, audio, video and images for the project are collected in appropriate digital formats. They can be collected from inside documentation and outside resources.

3.4 Assembly

The fourth step is authoring and ActionScript programming. ActionScript is the programming language that enables us to use Adobe Flash Professional CS4 to create highly interactive, multimedia-based Web sites, product demos, teaching materials, and more. The published application can be run on mobile device that is provided with Flash Lite Player. The mobile multimedia use mobile phone Nokia X6, because Nokia C6 uses touch screen as interactive tool and supports Flash Lite Player 3.0. ActionScript is a language that bridges the gap between what we understand and what Flash understands. Like all languages, ActionScript contains many different elements, such as words, punctuation, and structure - all of which we must employ properly to get our Flash project to conduct the way we want it to [14].

Learners can learn about multimedia, game, and Adobe Flash through Scene 2, Scene 3, and Scene 4. To develop Scene 5 Play Game, take the following steps:

1. Create a new Layer named Play Game and then make white box content of three image movie clips. The images are chicken, dog, and rabbit. Every image movie clip consists of ten parts of image as movie clips as shown in Figure 2..

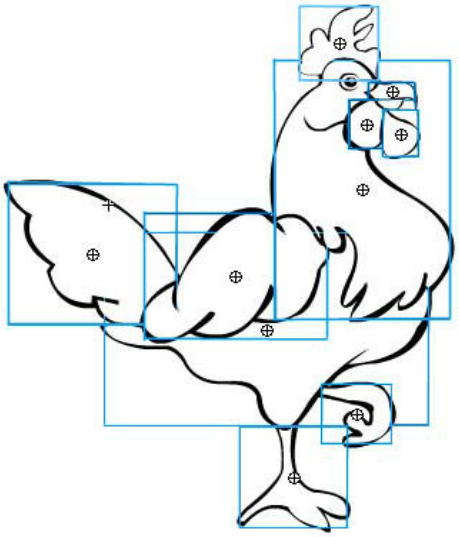

Figure 2: An image movie clip consists of ten movie clips

Every movie clip needs script as follow:

```
on (release) {
    mc=new Color(this);
    mc.setRGB(_root.warna)
    _root.score=_root.score + 10;
}
```

The script indicates that score increase with 10 if the part of image has been colored. Hence total score is 100 if the user can fill all the part of an image with color.

2. Create 18 color buttons to choose color for filling in the image. One of the buttons needs script as follow:

```
on (release) {
    _root.color=0xAE0000;
    mycolor=new Color(_root.box);
    mycolor.setRGB(_root.color);
}
```

Create the script of all the buttons and change the color code 0xAE0000 to the other color codes to make some other colors.

3. Create a button Left to choose the image that will be colored by pressing with the script:

```
on (release) {
    _root.index--;
    if(_root.index<0) { _root.index=2;}
    _root.chicken._visible=false;
    _root.dog._visible=false;
    _root.rabbit._visible=false;
    switch(_root.index){
    case 0: _root.chicken._visible=true;break;
    case 1: _root.dog._visible=true;break;
    case 2: _root.it._visible=true;break;
}
```

4. Create a button Right to choose the image that will be colored by pressing with the script as the same as the script of button Left, but it must be a line changed. The second line _root.index--; should be changed with _root.index++;
5. Create a box with Rectangle Tools, and convert it to be a movie clip symbol named Color Box. It's instance on the stage should be named box by filling the name at the window Properties.
6. Create a Dynamic Text with the label Time on the top of the stage. The variable of the text named displayTime. On the frame corresponds to it needs script as follow:

```
stop();
var color;
var index;
index=0;
_root.anjing._visible=false;
_root.ayam._visible=false;
_root.score= 0;
displayTime = 25;
countDown = function () {
```

```
        displayTime--;
        if (displayTime == 0) {
                clearInterval(timer);
        }
}
timer = setInterval(countDown, 1000);
if (displayTime == 0){
        gotoAndPlay("loose");
}
if(score >= 100){
        gotoAndPlay("win");
}
```

The script indicates that the first number on display time is 25 with decreasing to 0. If the time equal to 0, then the game is over. Score = 0 indicates that the score value is st up to 0 at the beginning of the game. Figure 3 presents the layout of the stage and timeline in Flash Document, and Figure 4 presents the Flash document that is run on Adobe Device Central CS4 emulator uses a mobile device Nokia X6.

Learners can learn how to create image to be filled with color through Scene 6. Scene 7 presents the tutorial how learners create the components of coloring game, that are color buttons for deciding color that is used to fill an image, place images into stage and the corresponding script. While learning to make timer and score can be done through Scene 8 and Scene 9.

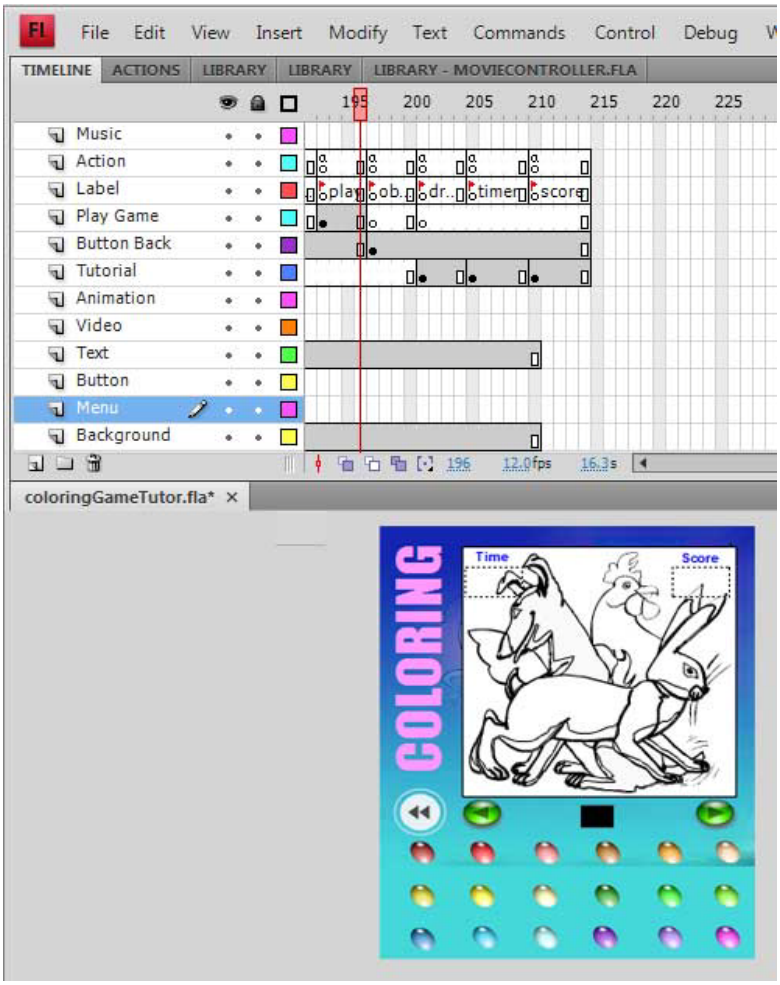

Figure 3: Layout of stage and timeline in Flash document

Figure 4: Running Scene 1 and Scene 5 on an emulator

3.5 Testing

The fifth step is Testing, the application runs and to be checked to confirm that it performs exactly what the author has intended. The experiment is devided into two phases, preliminary testing and main field testing. At the preliminary testing, the mobile multimedia is tested on variety resolutions, interactivity tools of mobile devices. The sources of mobile multimedia are copied into variety mobile devices. The application can run on the devices with keypad or touch screen as the interactive tools if they are provided with Flash Lite Player. The mobile devices with the resolution different from 360 x 640 pixels cannot display the application well, there is blank areas on the device or the application is cropped. Figure 5 presents the application run on some different resolution of mobile devices.

Figure 5: Application run on variety resolution of mobile devices

Table 1: Student's competency in coloring game development

No	Respondent	Design					Animation			Programming					Score
		A11	A12	A21	A22	A3	B11	B12	B2	B3	C11	C12	C2	C3	
1	Student 1	1	1	1	1	1	1	1	1	1	1	1	1	0	medium
2	Student 2	1	1	0	1	1	1	1	1	0	1	1	1	1	basic
3	Student 3	1	1	1	1	0	1	1	0	0	1	1	1	0	basic
4	Student 4	1	1	0	1	0	1	1	1	0	1	1	0	0	basic
5	Student 5	1	1	0	1	0	1	0	0	1	1	1	0	0	not competent
6	Student 6	1	1	1	1	1	1	1	1	1	1	1	1	1	smart
7	Student 7	1	1	1	1	1	1	1	1	1	1	1	1	0	medium
8	Student 8	1	1	0	1	0	1	1	0	0	1	1	1	0	basic
9	Student 9	1	1	1	1	1	1	1	1	1	1	1	1	0	medium
10	Student 10	1	1	1	1	1	1	1	1	1	1	1	1	0	medium
11	Student 11	1	0	0	1	0	1	1	1	0	1	1	1	0	not competent
12	Student 12	1	1	1	1	1	1	1	1	1	1	1	1	1	smart
13	Student 13	1	1	1	1	1	1	1	1	1	1	1	1	1	smart
14	Student 14	1	1	0	1	0	1	1	0	1	1	1	1	0	basic
15	Student 15	1	1	0	1	0	1	1	0	1	1	1	1	0	basic
16	Student 16	1	1	0	1	0	0	1	0	1	1	1	1	0	not competent
17	Student 17	1	1	0	1	0	1	1	0	1	1	1	1	0	basic
18	Student 18	1	1	0	1	0	1	1	0	1	1	1	1	0	basic
19	Student 19	1	1	0	1	0	1	1	0	1	1	1	1	0	basic
20	Student 20	1	1	0	1	1	1	1	0	1	1	1	1	0	basic
21	Student 21	1	1	1	1	1	1	1	1	1	1	1	1	1	smart

Design	Animation
A11 = Capable to make simple vector graphics	B1 = Capable to make animation
A12 = Capable to make object contras	B2 = Capable to make animation effect
A21 = Capable to make complex vector graphics	B2 = Capable to make animation effect

Programming

C11 = Capable to make fill object with color

C21 = Capable to make timer and feedback

C2 = Capable to make score

C3 = Capable to make creativity complete application

Main field testing was conducted at Universitas Multimedia Nusantara involving 21 students of fifth or seventh semester who are studying Flash Scripting course and a lecturer. The lecturer explained the guideline for developing multimedia application especially coloring game, then students tried to make a coloring game based on the application. After learning the tutorial on mobile device student developed coloring game. Student should have competency in making coloring game. The three competency should be achieved by students are basic, medium and smart. Student who has basic competency should be able to make simple vector graphics, object contras, animation, script to fill object with color, timer and feedback. Student who has medium competency should have basic competency and be able to make complex vector graphics, design continuity, and score. Student who has smart competency should has medium competency and he or she should be able to make good anatomical complex vector graphics, button, and creative complete application. Table 1 shows the assessment of students that there are 3 students (14.29 per cent) who are not competent, 10 students (47.05 percent) in the basic competency, 4 students (19.05 per cent) in the medium competency, and 4 students (19.05 per cent) in the smart competency. It means that there are 85.71 per cent of students that can develop multimedia application particularly coloring game.

4 Conclusion

Through this paper developing a tutorial that runs mobile device to create coloring game has been presented. Some details about creating vector graphics, movie clips, and scripting that should be learned by students have been described. The mobile multimedia have been well tested by the students at the Universitas Multimedia Nusantara, there are some conclusions:

1. Mobile multimedia can be easily developed using Adobe Flash Professional CS4 with ActionScript 2.0 and Flash Lite Player 3.0.

2. Mobile multimedia can be implemented on variety mobile device either with touch screen or keypad as interactive tool, but the application runs well on 360 x 640 pixels mobile device.
3. Tutorial on mobile multimedia can be used by students as learning resource, and students can learn anywhere and anytime using mobile device.

5 Scope for Future Research

For future work, the mobile multimedia should be able run on every platform, any kind of mobile device, and variety resolution of mobile devices. The mobile multimedia needs to be developed as client-side application, hence users access the application from the web server.

6 Acknowledgment

I wish to express my grateful acknowledgment to Elisa, a student of the Faculty of Art and Design Universitas Multimedia Nusantara, Indonesia for all her support on this project.

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PENGARUH STRATEGI PEMBELAJARAN DAN KECEMASAN TERHADAP HASIL BELAJAR MATEMATIKA

Rusmono[4]

Abstract:

The research is intended to discover the effect of instructional strategies and math anxiety on learning outcomes in mathematics. Factorial design 2 x 2 was employed in order to answer the research question how the effect of the instructional strategies and math anxiety on learning outcomes in mathematics.The study supports the following hypotheses: 1) in general, students who were taught by using problem based learning (PBL) strategy had higher learning outcomes than those taught by expository strategy, 2) students with higher math anxiety who were taught by using PBL strategy had higher learning outcomes than those by expository strategy, 3) students with lower math anxiety who were taught by PBL strategy had lower learning outcomes than those by expository strategy, and 4) there was an effect of interaction between instruction strategies and math anxiety on students learning outcomes in mathematics. It means that the effect of instructional strategies has a correlation with the characteristic of the students who engage in teaching learning process. It implies that there is no single instructional strategy that gives better result on learning outcomes in mathematics for all students with the different math anxieties. Based on this research findings mathematics vocational teachers in the field of technology and industry should apply several instructional strategies to serve students with different math anxieties.

Kata Kunci: *Hasil Belajar Matematika, Kecemasan, Strategi PBL.*

PENDAHULUAN

Hasil belajar matematika pada jenjang pendidikan dasar menengah di Indonesia secara umum masih relatif rendah jika dibandingkan dengan mata pelajaran lainnya, seperti temuan Pusat Pengembangan Penataran Guru (PPPG) Matematika tahun 2004 (Suparlan,2005: 1). Di samping itu, mata pelajaran matematika juga masih memperoleh stigma sebagai mata pelajaran momok yang amat menakutkan. Secara individual, ada beberapa siswa Indonesia yang berhasil meraih medali dalam kegiatan *International Mathematic Olympiad* (*IMO*), namun secara keseluruhan hasil belajar matematika siswa-siswi Sekolah Menengah Pertama (SMP) Indonesia berdasarkan TIMMS-R (*The*

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*Third International Mathematics and Science Study-Repeat,*1999) belum menduduki peringkat sepuluh besar dari 38 negara yang diteliti. Demikian pula *Trend in International Mathematics and Science Study* (TIMSS) melaporkan bahwa rata-rata skor matematika siswa kelas 8 SMP Indonesia belum memperoleh rata-rata skor matematika siswa internasional (Sondakh, 2006: 2).

Rendahnya hasil belajar matematika menurut guru matematika Sekolah Menengah Kejuruan (SMK) teknologi dan industri disebabkan oleh kurangnya perhatian atau keseriusan siswa mengikuti proses belajar mengajar. Kekurang-seriusan siswa dalam mengikuti proses belajar matematika umumnya disebabkan oleh kurangnya pemahaman para siswa mengenai manfaat matematika dalam dunia kerja. Faktor lain adalah strategi pembelajaran yang dikembangkan oleh guru matematika belum membuat para siswa menjadi tertarik untuk belajar matematika.

Dalam kurikulum SMK teknologi dan industri, matapelajaran matematika bertujuan: 1) melatih cara berpikir dan bernalardalam menarik kesimpulan; 2) mengembangkan aktifitas kreatif yang melibatkan imajinasi, intuisi, danpenemuan dengan mengembangkanpemikiran divergen, orisinil, rasa ingintahu, membuat prediksi dan dugaan,sertamencoba-coba; 3) mengembangkan kemampuan memecahkan masalah; dan 4) mengembangkan kemampuan menyampaikan informasi atau mengkomunikasikan gagasan melalui pembicaraan lisan, grafik, peta, dan diagram (Kisroi, 2007: 9). Dikatakan Kisroi, salah satu penyebabnya adalah penggunaan strategi pembelajaran yang lebih menempatkan aktivitas guru sebagai satu-satunya sumber belajar.

Strategi pembelajaran yang selama ini dikembangkan oleh guru matematika di SMK berakibat pada konstribusi siswa sebatas mengecek penerimaan dan penafsiran terhadap konsep dan prosedur matematika, sehingga menimbulkan rasa cemas pada diri siswa terutama setiap akan mengerjakan tugas-tugas maupun saat akan mengikuti tes.

Oleh karena itu, upaya pembaharuan dalam pembelajaran matematika sangat dibutuhkan agar pemahaman dan pemaknaan matematika dapat dengan mudah diperoleh termasuk manfaat matematika dalam kehidupan sehari-hari, sehingga siswa tidak lagi merasa cemas saat akan mengerjakan tugas maupun mengikuti tes matematika. Dengan demikian pembelajaran matematika tidak lagi menjadi momok bagi semua siswa, sehingga diharapkan hasil belajaranya akan meningkat dari waktu ke waktu.

Berdasarkan uraian yang telah dikemukakan, nampak bahwa peran strategi pembelajaran dalam kegiatan pembelajaran matematika cukup penting. Untuk itu dianggap perlu untuk melakukan suatu penelitian tentang pengaruh strategi pembelajaran dan kecemasan teradap hasil belajar matematika.

Strategi pembelajaran pada penelitian ini adalahpedoman umum kegiatan guru-siswa dalam mewujudkan peristiwa pembelajaran yang efektif untuk mencapai tujuan tertentu, yang terbentuk oleh paduan antara kegiatan pembelajaran, metode, media, dan pendefinisian peran guru dan siswa. Dalam penelitian ini diujicobakan dua strategi pembelajaran, yaitu strategi pembelajaran ekspositori dan *Problem Based Learning (PBL).*

Strategi pembelajaran dengan PBL menawarkan kebebasan siswa dalam proses pembelajaran. Panen (2001:85) mengatakan dalam strategi pembelajaran dengan PBL, siswa diharapkan untuk terlibat

dalam proses penelitian yang mengharuskannya untuk mengidentifikasi permasalahan, mengumpulkan data, dan menggunakan data tersebut untuk pemecahan masalah. Smith & Ragan (2003:3) dalam Visser mengatakan bahwa strategi pembelajaran dengan PBL merupakan usaha untuk membentuk suatu proses pemahaman isi suatu mata pelajaran pada seluruh kurikulum. Keterlibatan siswa dalam strategi pembelajaran dengan PBL menurut Baron (1999:3), meliputi kegiatan kelompok dan kegiatan perorangan. Dalam kelompok siswa melakukan kegiatan-kegiatan: 1) membaca kasus, 2) menentukan masalah mana yang paling relevan dengan tujuan pembelajaran, 3) membuat rumusan masalah, 4) membuat hipotesa, 5) mengidentifikasi sumber informasi, diskusi, dan pembagian tugas, 6) melaporkan, mendiskusikan penyelesaian masalah yang mungkin, melaporkan kemajuan yang dicapai setiap anggota kelompok, dan presentasi di kelas.

Bentuk kegiatan strategi pembelajaran ekspositori menurut Romizouwski (1984: 56) dimulai dari pemaparan informasi, pemberian tes, pemberian latihan soal, danpemberian kesempatan untuk menerapkan informasi yang telah dipelajari pada situasi dan masalah yang berbeda. Sementara itu menurut Burry dan King (1994:174), kegiatan dalam pembelajaran ekspositori, meliputi: 1) *setting the scene*atau persiapan pembelajaran; 2) *Presenting the material* atau penyajian materi oleh guru; 3) *Student activity*atau kegiatan siswa yang meliputi membaca, menulis, mengerjakan tugas, mengingat hal-hal penting dalam pelajaran, memecahkan masalah; dan 4) *Checking understanding/transfering material to real life*, yaitu untuk mengetahui apakah siswa memahami materi pelajaran yang disampaikan guru atau tidak.

Kecamasan adalah respons normal dari emosional dan fisik yang terjadi ketika seseorang diliputi oleh takut terhadap sesuatu yang akan terjadi yang ia mungkin tidak dapat mengatasi atau di luar kendalinya. Definisi ini mengandung dua dimensi, yakni emosi dan fisik, meskipun ada yang menyebut kedua hal itu merupakan satu dari dimensi *emotionality* (Jailani, 2002:25). Untuk mengetahui adanya kecemasan pada seseorang, Blackburn dan Davidson seperti dikutip Jailani (2002:47) dapat dilihat dari gejala-gejala yang ada, seperti suasana hati, pikiran, motivasi, perilaku dan gejala biologis. Orang yang terkena gangguan kecemasan memperlihatkan mudah marah, perasaan sangat tegang, khawatir, sukar berkonsentrasi, mudah lupa, pikiran kosong, membesar-besarkan ancaman, memandang dirinya sebagai angat sensitif, merasa tidak berdaya, menghindari situasi, ketergantungan tinggi, ingin melarikan diri, gelisah, gugup, kewaspadaan yang berlebihan, gerakan otomatis meningkat: misalnya berkeringat, gemetar, pusing, berdebar-debar, mual, dan mulut kering.

Pengaruh kecemasan matematika terhadap kinerja siswa tergantung pada kualitas dan daya tahan pribadinya terhadap kecemasan itu sendiri. Jadi dalam kondisi yang stabil kecemasan matematika dapat menguntungkan, tetapi dalam kondisi yang tidak stabil yaitu terlalu rendah atau terlalu tinggi, maka kecemasan matematika akan menjadi faktor penghambat dalam pencapaian hasil belajar seperti yang diharapkan. Sementara itu Anastasi dan Urbina (1997:21) menjelaskan bahwa hubungan antara kecemasan matematika dengan hasil tes adalah tidak linier.

Dari uraian di atas, dapat disimpulkan bahwa kecemasan matematika adalah suatu respons dari seseorang terhadap (stimulus) matematika yang menunjukkan adanya suatu bahaya yang harus dihindari,

kekurang-mampuan, atau adanya kemungkinan kegagalan dalam merespons matematika tersebut, yang diindikasikan dengan pelemahan daya ingat, defisit performansi kognitif, tidur terganggu, *worry*, kurang kendali, terganggunya fungsi psikis, suasana hati, kewaspadaan memuncak, aktivitasterganggu, gerakan otomatis meningkat, gangguan fungsi *genitourinary*, dan atau koordinasi motor terganggu. Indikasi-indikasi tersebut dapat dikelompokkan ke dalam dimensi kognitif (pikiran), emosi, dan fisiologis. Dalam kajian ini, aspek matematika mencakup : materi; proses belajar mengajar (yang didalamnya melibatkan guru); evaluasi; dan penerapan matematika baik pada disiplin ilmu tertentu, maupun dalam kehidupan sehari-hari.

Hipotesis penelitian ini adalah sebagai berikut: (1) Secara keseluruhan hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada hasil belajar siswa yang mengikuti strategi pembelajaran ekspositori; (2) Hasil belajar matematika siswa yang memiliki tingkat ecemasan matematika tinggi yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada siswa yang mengikuti strategi pembelajaran Ekspositori; (3) Hasil belajar matematika siswa yang memiliki tingkat kecemasan matematika rendah yang mengikuti strategi pembelajaran dengan PBL lebih rendah daripada siswa yang mengikuti strategi pembelajaran Ekspositori; dan (4) Terdapat pengaruh interaksi antara strategi pembelajaran dankecemasan matematika terhadap hasil belajar matematika.

METODOLOGI PENELITIAN

Penelitian ini dilaksanakan di SMKN 39 Jakarta Pusat pada semester genap tahun pelajaran 2008-2009. Metode yang digunakan adalah metode eksperimen dengan disain faktorial 2x2. Variabel terikat dalam penelitian ini adalah hasil belajar matematika siswa. Variabel bebas perlakuan adalah strategi pembelajaran, yang dibedakan menjadi dua kelompok, yaitu strategi pembelajaran dengan PBL sebagai kelompok eksperimen dan strategi pembelajaran Ekspositori sebagai kelompok kontrol. Variabel bebas intervensi yang berupa variabel atribut adalah kecemasan matematika.

Pengumpulan data yang digunakan adalah tes kecemasan matematika yang dikembangkan oleh Jailani (2002:159) yang telah diujicoba kembali dan tes hasil belajar metematika. Untuk pengujian hipotesis dilakukan dengan menggunakan Teknik Analisis Varians (ANAVA) dua jalur yang dilanjutkan dengan uji Scheffe'.

HASIL PENELITIAN DAN PEMBAHASAN

Berdasarkan hasil analisis data dengan ANAVA dua jalur pembuktian hipotesis dalam penelitian ini dapat dijelaskan dalam uraian berikut. **Pertama**, secara keseluruhan terdapat perbedaan hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada hasil belajar matematika siswa yang mengikuti strategi pembelajaran Ekspositori. Dari hasil perhitungan diperoleh skor rata-rata untuk kelompok siswa yang mengikuti strategi pembelajaran dengan PBL

sebesar 24,12, sedangkan kelompok siswa yang mengikuti strategi pembelajaran Ekspositori memiliki skor rata-rata sebesar 21,90.

Hasil perhitungan ANAVA dua jalur menunjukkan bahwa nilai F_h = 40,67 yang ternyata lebih besar dari nilai F_t = 3,91 untuk taraf signifikansi α=0,05 atau ($F_h > F_t$). Ini berarti bahwa H_0 ditolak dan H_1 diterima, sehingga terdapat perbedaan pengaruh yang signifikan antara penerapan strategi pembelajaran dengan PBL dengan strategi pembelajaran Ekspositori terhadap hasil belajar matematika.

Hasil uji Scheffe' diperoleh Fh sebesar 41,07 dan Ft sebesar 2,70 pada taraf signifikansi α = 0,05. Ternyata Fh> Ft sehingga H_0 ditolak dan H_1 diterima. Dengan demikian dapat disimpulkan bahwa, secara keseluruhan hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada siswa yang mengikuti strategi pembelajaran ekspositori.

Kedua, hasil belajar matematika kelompok siswa yang memiliki kecemasan matematika tinggi dan mengikuti strategi pembelajaran dengan PBL memiliki skor rata-rata sebesar 25,68, sedangkan kelompok siswa yang memiliki kecemasan matematika tinggi dan mengikuti strategi pembelajaran Ekspositori memiliki skor rata-rata sebesar 18,38.

Hasil uji Scheffe' diperoleh F_h sebesar 197,37, sedangkan F_t untuk taraf signifikansi α = 0,05 sebesar 2,80 dan F_t untuk taraf signifikansi 0,01 besarnya 4,22. Ternyata nilai F_h lebih besar daripada F_t baik pada taraf signifikansi 0,05 maupun untuk taraf signifikansi 0,01, sehingga H_0 ditolak dan H_1 diterima. Artinya bagi kelompok siswa yang memiliki kecemasan matematika tinggi, siswa yang mengikuti strategi pembelajaran dengan PBL memiliki hasil belajar matematika yang lebih tinggi daripada siswa yang mengikuti strategi pembelajaran Ekspositori.

Ketiga, hasil belajar matematika bagi siswa yang memiliki tingkat kecemasan matematika rendah yangmengikuti strategi pembelajaran dengan PBL lebih rendah daripada siswa yang mengikuti strategi pembelajaran Ekspositori. Dari hasil perhitungan diperoleh skor rata-rata kelompok siswa yang memiliki kecemasan matematika rendah dan mengikuti strategi pembelajaran dengan PBL memiliki sebesar 21,72, sedangkan kelompok siswa yang memiliki kecemasan matematika rendah dan mengikuti strategi pembelajaran ekspositori memiliki skor rata-rata sebesar 23,89.

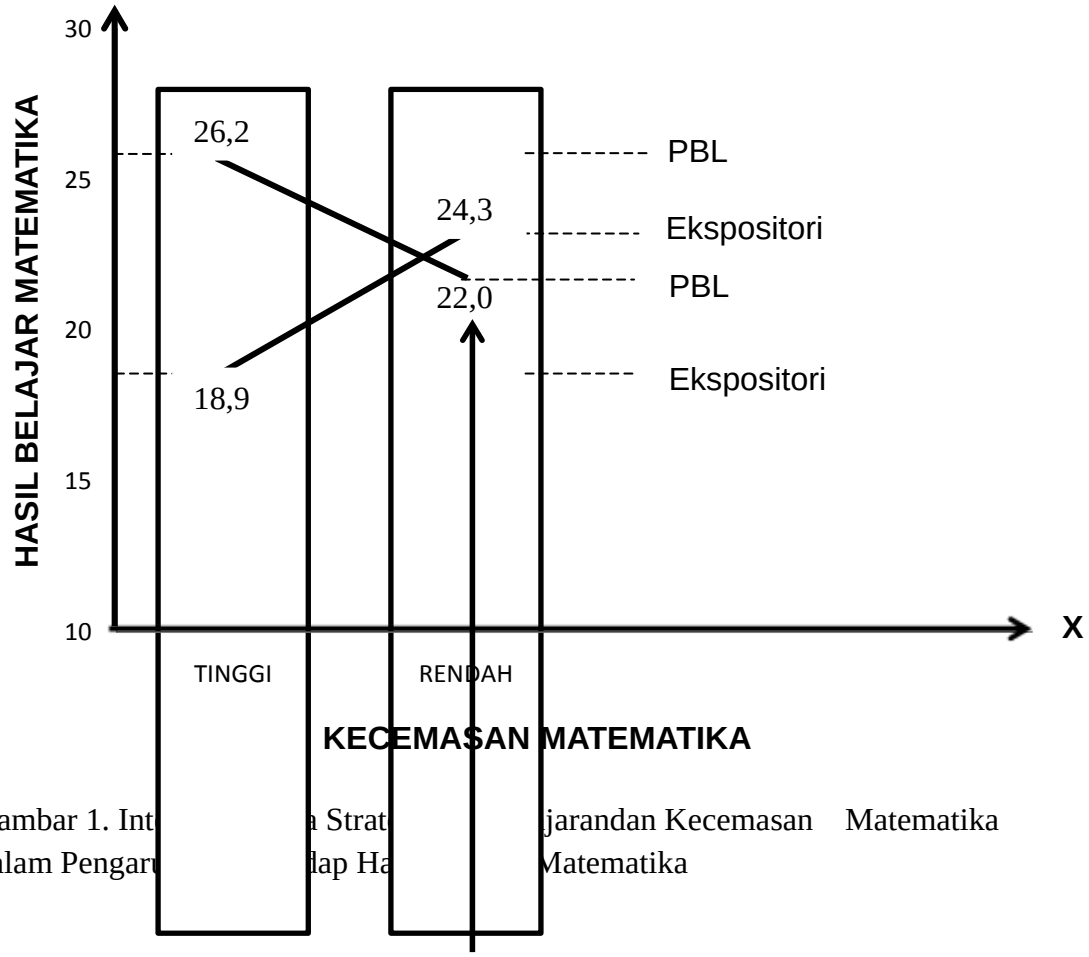
Berdasarkan uji Scheffe' diperoleh F_h sebesar 18,84, sedangkan F_t untuk taraf signifikansi 0,05 sebesar 2,80 dan F_t untuk taraf signifikansi 0,01 besarnya 4,22. Ternyata nilai F_h lebih kecil daripada F_t baik pada taraf signifikansi 0,05 maupun untuk taraf signifikansi 0,01, sehingga H_0 diterima dan H_1 ditolak. Artinya bagi kelompok siswa yang memiliki kecemasan matematika rendah, siswa yang mengikuti strategi pembelajaran dengan PBL memiliki hasil belajar matematika yang lebih rendah daripada siswa yang mengikuti strategi pembelajaran Ekspositori.

Keempat, terdapat pengaruh interaksi antara strategoi pembelajaran dan kecemasan matematika terhadap hasil belajar matematika. Hasil uji hipotesis kedua menunjukkan bahwa, hasil belajar matematika siswa yang memiliki kecemasan matematika tinggi dan mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada siswa yang memiliki kecemasan matematika tinggi dan mengikuti strategi pembelajaran Ekspositori. Hasil uji hipotesis ketiga menunjukkan bahwa, hasil belajar

matematika siswa yang memiliki kecemasan matematika rendah dan mengikuti strategi pembelajaran dengan PBL lebih rendah daripada siswa yang memiliki kecemasan matematika rendah dan mengikuti strategi pembelajaran Ekspositori.

Hasil uji hipotesis kedua dan ketiga mengindikasikan adanya interaksi antara strategi pembelajaran dengan kecemasan matematika dalam pengaruhnya terhadap hasil belajar matematika. Hasil perhitungan ANAVA mengukuhkan indikasi tersebut, karena dari perhitungan diperoleh F_h = 176,99 yang ternyata lebih besar daripada nilai F_t = 3,91 untuk taraf signifikansi α = 0,05 dan lebih besar juga daripada F_t = 6,90 untuk taraf signifikansi α = 0,01 atau $F_h > F_t$. Hal ini berarti H_0 ditolak dan H_1 diterima, sehingga dapat disimpulkan bahwa, terdapat pengaruh interaksi yang sangat signifikan antara strategi pembelajaran dan kecemasan matematika dalam pengaruhnya terhadap hasil belajar matematika.

Interaksi antara strategi pembelajaran dan kecemasan matematika dalam pengaruhnya terhadap hasil belajar matematika secara grafis tampak pada Gambar 1. di bawah ini.



Gambar 1. Int a Strat jarandan Kecemasan Matematika dalam Pengaru lap Ha Matematika

Pengujian keempat hipotesis yang diajukan pada penelitian ini telah menghasilkan rincian hasil uji hipotesis sebagai berikut.

P**ertama**, hasil uji hipotesis pertama telah berhasil menolak hipotesis nol yang menyatakan tidak ada perbedaan hasil belajar matematika antara kelompok siswa yang mengikuti pembelajaran dengan strategi pembelajaran dengan PBL dan kelompok siswa yang mengikuti strategi pembelajaran Ekspositori. Sehingga secara keseluruhan terdapat perbedaan hasil belajar matematika antara siswa yang mengikuti strategi pembelajaran dengan PBL dengan siswa yang mengikuti strategi pembelajaran Ekspositori, yaitu hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada hasil belajar matematika siswa yang mengikuti strategi pembelajaran Ekspositori.

K**edua**, hasil uji hipotesis kedua berhasil menolak hipotesis nol yang menyatakan tidak ada perbedaan hasil belajar matematika siswa yang memiliki kecemasan matematika tinggi, antara kelompok siswa yang mengikuti strategi pembelajaran dengan PBL dan kelompok siswa yang mengikuti strategi pembelajaran Ekspositori. Sehingga terdapat perbedaan hasil belajar matematika siswa yang memiliki tingkat kecemasan matematika tinggi antara yang mengikuti strategi pembelajaran dengan PBL dengan yang mengikuti strategi pembelajaran Ekspositori, yaitu hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada hasil belajar matematika siswa yang mengikuti strategi pembelajaran Ekspositori.

K**etiga**, hasil uji hipotesis ketiga berhasil menolak hipotesis nol yang menyatakan tidak ada perbedaan hasil belajar matematika siswa yang memiliki kecemasan matematika rendah, antara kelompok siswa yang mengikuti strategi pembelajaran dengan PBL dan kelompok siswa yang mengikuti strategi pembelajaran Ekspositori. Sehingga terdapat perbedaan hasil belajar matematika siswa yang memiliki tingkat kecemasan matematika rendah antara siswa yang mengikuti strategi pembelajaran dengan PBL dengan yang mengikuti strategi pembelajaran Ekspositori, yaitu hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih rendah daripada hasil belajar matematika siswa yang mengikuti strategi pembelajaran Ekspositori.

K**eempat**, hasil uji hipotesis keempat telah berhasil menolak hipotesis nol yang menyatakan tidak terdapat interaksi antara strategi pembelajaran dengan PBL dan kecemasan matematika dalam pengaruhnya terhadap hasil belajar matematika. Jadi uji hipotesis keempat menunjukkan bahwa terdapat interaksi antara strategi pembelajaran dan kecemasan matematika dalam pengaruhnya terhadap hasil belajar matematika.

Berdasarkan temuan penelitian yang telah dipaparkan, maka implikasi terhadap hasil belajar matematika adalah sebagai berikut. **Pertama.** strategi pembelajaran dengan PBL perlu lebih banyak digunakan dan dikembangkan dalam pembelajaran matematika, khususnya di SMK teknologi dan industri. Dalam strategi pembelajaran dengan PBL, proses pembelajaran tidak hanya "*transfer of knowledge*", akan tetapi proses pembelajaran matematika dapat lebih bersifat membangun pengetahuan melalui berbagai aktivitas belajar, seperti membaca suatu permasalahan, mendiskusikannya dengan sesama siswa, mengakses informasi dari berbagai sumber belajar, menyimpulkan, dan mengkomunikasikan. Siswa diberikan kesempatan terlibat aktif dalam berbagai aktivitas dan pengalaman untuk menemukan sendiri berbagai konsep dan prosedur matematika. Dengan demikian

proses pembelajaran dapat memenuhi kebutuhan siswa sesuai dengan karakteristik dan tujuan dari mata pelajaran matematika.

Kedua, Pergeseran Peran Guru dalam Pembelajaran Matematika. Terjadinya pergeseran peran guru dalam proses pembelajaran matematika. Penelitian ini membuktikan bahwa penggunaan strategi pembelajaran dengan PBL dalam pembelajaran matematika secara keseluruhan lebih efektif dibandingkan dengan strategi pembelajaran Ekpositori, apalagi bagi siswa yang memiliki kecenderungan kecemasan matematika tinggi. Hal ini menunjukkan bahwa strategi pembelajaran yang bertumpu pada siswa lebih efektif daripada strategi pembelajaran yang bertumpu pada guru. Dengan demikian perlu adanya perubahan peran guru yang semula kegiatan belajar berpusat pada guru menuju ke arah kegiatan belajar yang terpusat pada siswa dalam proses pembelajaran matematika di kelas. Guru diharapkan mau berbagi peran dengan sumber belajar lain yang ada di kelas, lingkungan sekitar sekolah dan siswa, sehingga guru perlu menyadari bahwa dia bukan satu-satunya sumber belajar bagi siswa.Dalam kaitan ini, guru hendaknya tidak lagi berperan penuh sebagai pengajar yang menguasai proses pembelajaran matematika di kelas, akan tetapi diharapkan lebih banyak berperan sebagai fasilitator, motivator dan dinamisator dalam proses pmbelajaran. Dengan demikian guru mampu mendayagunakan berbagai sumber belajar yang ada di kelas, sekolah, maupun lingkungan sekitar agar dapat membantu mempermudah siswa dalam belajar. Sebagai fasilitator, motivator dan dinamisator guru hendaknya juga memberi bimbingan dan arahan yang diperlukan, agar siswa mau belajar lebih rajin dan tekun dalam rangka mencapai tujuan belajarnya. Oleh karena itu, guru diharapkan mampu bertindak sebagai manajer di kelas yang dapat memberdayakan segala sumber belajar yang ada untuk kepentingan proses pembelajaran.Agar pergeseran peran guru dalam proses pembelajaran tersebut dapat terlaksana, ada tiga hal yang perlu diperhatikan, yaitu: (a) Semua komponen penyelenggara pendidikan di sekolah, baik guru maupun kepala sekolah perlu mengubah sikap dan pandangannya terhadap siswa. Dalam pembelajaran, siswa hendaknya dipandang bukan lagi sebagai objek pembelajaran yang dianggap kurang aktif dan hanya menerima apa yang disampaikan guru. Akan tetapi, siswa hendaknya dipandang sebagai subyek belajar yang sedang tumbuh dan berkembang, penuh dengan potensi diri, dan memiliki kecenderungan untuk mengembangkan diri dan siap dikembangkan. Siswa adalah subyek belajar yang aktif dan membutuhkan perhatian dan pengakuan dari guru. Dalam kaitan ini, sekolah seyogiyanya bertanggung jawab mengupayakan bagaimana siswa yang memiliki potensi untuk berkembang itu memperolah kesempatan seluas-luasnya untuk mengembangkan diri melalui proses pembelajaran di sekolah. Guru hendaknya diberi kesempatan untuk ,mengembangkan program-program pembelajaran yang dapat mendukung dan menstimulasi perkembangan siswa seoptimal mungkin; (b) Dalam proses pembelajaran matematika di sekolah, hendaknya lebih banyak memberikan tantangan berupa tugas-tugas yang bersifat memecahkan masalah (*problem solving*) kepada siswa. Tugas-tugas yang berupa *problem solving* dapat memberikan kesempatan kepada siswa untuk menunjukkan kemampuannya dalam berpikir, bertindak, dan bersikap kritis. Dengan memperbanyak kegiatan-kegiatan tersebut, berarti memperbesar kesempatan siswa untuk mengembangkan "*sense of enquiry*" dan kemampuan berpikir kritis. Melalui tugas-tugas yang menantang, secara langsung maupun tidak langsung mendorong siswa untuk melakukan berbagai aktivitas berpikir dan berbagai aktivitas proses matematika yang sangat

bermanfaat dalam upaya membangun sendiri berbagai pengetahuan yang diperlukan. Untuk itu, analisis tugas-tugas yang menantang siswa perlu dikembangkan oleh guru agar proses pembelajaran matematika lebih menggairahkan dan menyenangkan; (c) Pembelajaran matematika di SMK bidang teknologi dan industri perlu lebih ditekankan pada segi proses, selain produk dan sikap. Orientasi pembelajaran matematika di SMK teknologi dan industri perlu mulai bergeser dari orientasi isi atau materi pelajaran menuju arah proses pembelajaran.

Ketiga, Hasil Penelitian pada Lembaga Pendidikan Tenaga Kependidikan (LPTK). Secara lebih khusus sesuai dengan lingkup penelitian yang dilakukan implikasi dari hasil penelitian ini adalah ditujukan kepada Lembaga Pendidikan Tenaga Kependidikan (LPTK), khususnya Program Studi Pendidikan Matematika (PM). Program Studi PM sebagai lembaga pendidikan prajabatan bagi calon guru matematika tingkat Sekolah Menengah termasuk SMK bidang teknologi dan industri, perlu membekali mahasiswanya dalam hal pengelolaan proses pembelajaran, khususnya dalam memilih strategi pembelajaran matematika yang sesuai dengan karakteristik siswa. Hal ini sangat penting karena terkait dengan cara memandang siswa sebagai subyek belajar yang aktif dan penuh dan penuh potensi untuk berkembang, serta guru sebagai fasilitator, motivator, dan dinamisator dalam proses pembelajaran. Dalam proses pembelajaran yang diutamakan bukan seberapa banyak menguasai materi pelajaran, tetapi lebih pada bagaimana siswa memperoleh pengetahuan itu sendiri.Berkenaan dengan hal tersebut para mahasiswa perlu dibekali dengan kemampuan dan keterampilan bagaimana menggunakan strategi pembelajaran dengan PBL dalam pembelajaran matematika, agar pada saatnya nanti setelah mereka menjadi guru dan mengajar di depan kelas, dapat mengembangkan dan menerapkannya dengan baik. Berkenaan dengan hal tersebut, ada dua hal yang perlu dilakukan untuk membekali kemampuan mahasiswa dalam memilih strategi pembelajaran matematika, yaitu: (a) Membiasakan mahasiswa belajar dan bekerja untuk mencari pemecahan masalah melalui berbagai aktivitas belajar seperti mengidentifikasi masalah, menyelidiki, mengakses berbagai sumber belajar, memprediksi, membuat kesimpulan, dan mengkomunikasikan hasil pemecahan masalah yang diperoleh. Kegiatan tersebut dapat diberikan melalui tugas-tugas yang menantang, yang dimulai dari kegiatan kelompok sampai kegiatan secara individual. Hasil kerja setiap kelompok dipresentasikan dan didiskusikan bersama mahasiswa lainnya di depan kelas, kemudian dosen memberikan lembar penilaian kepada setiap mahasiswa untuk mengetahui seberapa jauh materi kuliah dapat dicapai mahasiswa. Seberapa jauh materi kuliah dapat dicapai memang tidak perlu menjadi target yang harus dipaksakan, tetapi yang utama adalah memberikan pengalaman belajar kepada mahasiswa tentang bagaimana menerapkan proses pembelajarandengan menggunakan strategi pembelajaran dengan PBL. Untuk itu diperlukan kesadaran dari semua dosen pengampu mata kuliah di program studi Pendidikan Matematika untuk menguasai strategi pembelajaran dengan PBL; (b) Mengintegrasikan strategi pembelajaran dengan PBL ke dalam mata kuliah Proses Belajar Mengajar (PBM). Mata kuliah PBM diupayakan tidak sekedar menyampaikan materi berupa informasi-informasi berkenaan dengan belajar dan mengajar, tetapi juga mencoba menerapkan pengelolaan kegiatan pembelajaran yang mengacu pada strategi pembelajaran dengan PBL. Dalam kaitan ini mahasiswa diharapkan dapat mengintegrasikan berbagai pengalaman dari

mata kuliah bidang studi, mata kuliah PBM, maupun pengalaman dari penerapan strategi pembelajaran dengan PBL yang pernah dilakukan dalam mempelajari berbagai materi kulah.

KESIMPULAN

Berdasarkan hasil pengujian hipotesis, ditemukan beberapa hasil sebagai berikut:

Pertama, Secara keseluruhan hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada hasil belajar matematika siswa yang mengikuti strategi pembelajaran Ekspositori. Dari temuan ini dapat disimpulkan bahwa untuk meningkatkan hasil belajar matematika siswa SMK bidang teknologi dan industri dapat menggunakan strategi pembelajaran dengan PBL.

Kedua, bagi siswa yang memiliki kecenderungan kecemasan matematika tinggi, hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih tinggi daripada siswa yang mengikuti strategi pembelajaran Ekspositori. Dari temuan ini dapat disimpulkan bahwa untuk meningkatkan hasil belajar matematika siswa SMK bidang teknologi dan industri yang memiliki kecenderungan kecemasan matematika tinggi dapat dilakukan dengan menggunakan strategi pembelajaran dengan PBL.

Ketiga, bagi siswa yang memiliki kecenderungan kecemasan matematika rendah, hasil belajar matematika siswa yang mengikuti strategi pembelajaran dengan PBL lebih rendah daripada siswa yang mengikuti strategi pembelajaran Ekspositori. Dari temuan ini dapat disimpulkan bahwa untuk meningkatkan hasil belajar matematika siswa SMK bidang teknologi dan industri yang memiliki kecenderungan kecemasan matematika rendah dapat dilakukan dengan menggunakan strategi pembelajaran Ekspositori.

Keempat, ada pengaruh interaksi antara strategi pembelajaran dan kecemasan matematika terhadap hasil belajar matematika. Dari temuan ini dapat disimpulkan bahwa untuk meningkatkan hasil belajar matematika bagi siswa di SMK bidang teknologi dan industri yang memiliki kecenderungan kecemasan matematika tinggi dapat dilakukan dengan menggunakan strategi pembelajaran dengan PBL, sebaliknya bagi siswa yang memiliki kecenderungan kecemasan matematika rendah dapat dilakukan dengan strategi pembelajaran Ekspositori.

SARAN

Berdasarkan hasil temuan, pembahasan hasil penelitian, dan keterbatasan yang ada pada penelitian ini, beberapa saran dapat diajukan kepada guru sebagai pelaksana pembelajaran di kelas, kepada kepala sekolah, dan kepada peneliti lainnya. **Pertama**, Kepada Guru SMK bidang teknologi dan industri khususnya, disarankan agar: (a) Melaksanakan pembelajaran dengan menggunakan strategi

pembelajaran dengan PBL sebagai salah satu alternatif dalam pembelajaran matematika. Dengan strategi pembelajaran dengan PBL pencapaian hasil belajar matematika secara keseluruhan terbukti lebih berhasil dibandingkan dengan strategi pembelajaran Ekspositori. Strategi pembelajaran dengan PBL lebih memungkinkan terbelajarkannya mata pelajaran matematika secara utuh. Dengan kata lain, siswa lebih banyak terlibat secara aktif dalam proses pembelajaran, berlatih memecahkan masalah melalui diskusi dan mengakses informasi dari berbagai sumber belajar; (b) Dalam merancang dan mengembangkan program pembelajaran matematika, guru perlu memperhatikan karakteristik siswa yang memperoleh program pembelajaran matematika tersebut. Kepada siswa yang memiliki kecenderungan kecemasan matematika tinggi akan lebih tepat jika mengikuti srategi pembelajaran dengan PBL, sebaliknya bagi siswa yang memiliki kecenderungan kecemasan matematika rendah lebih tepat mengikuti strategi pembelajaran Ekspositori. Untuk itu, guru diharapkan lebih cermat dalam mengidentifikasi karakteristik siswa, karakteristik materi pelajaran, dan kompetensi yang hendak dicapai, agar dapat memilih dan menerapkan strategi pembelajaran matematika yang lebih tepat; (c) Guru hendaknya berusaha meningkatkan kemampuannya dalam menggunakan strategi pembelajaran dengan PBL. Hal ini sangat mendesak karena strategi pembelajaran dengan PBL relatif masih baru dan guru belum terbiasa menggunakannya; (d) Melakukan penilaian hasil belajar matematika siswa secara terus menerus dan berkesinambungan. Untuk itu, alat penilaian dapat dikembangkan dalam bentuk tes atau non tes dengan berbagai variasi sesuai dengan karakteristik objek yang dievaluasi dan tujuan yang ingin dicapai.

Kedua, kepada Kepala Sekolah SMK bidang teknologi dan industri diharapkan memberikan kesempatan kepada guru untuk melakukan berbagai upaya pembaharuan dalam proses pembelajaran matematika, khususnya dengan memutuskan untuk mengadopsi strategi pembelajaran dengan PBL sebagai salah satu alternatif strategi pembelajaran matematika di sekolah. Untuk melaksanakan keputusan tersebut, disamping menuntut pemberian kesempatan kepada guru, juga dibutuhkan dukungan dari kepala sekolah dan pengawas sekolah. Proses pembaharuan yang terjadi di tingkat kelas, akan sangat tergantgung dari kesempatan yang diberikan kepada guru untuk melaksanakan proses pembelajaran secara sungguh-sungguh, sebagai kerangka pencapaian tujuan pembelajaran secara keseluruhan. **Ketiga,** Kepada Peneliti Lain untuk mengembangkan penelitian lebih lanjut berkenaan dengan strategi pembelajaran matematika yang lebih memungkinkan dapat meningkatkan hasil belajar matematika siswa, dan mengkaji strategi pembelajaran lain serta dengan mempertimbangkan karakteristik siswa yang terkait dengan hasil belajar matematika. Berkenaan dengan itu, maka perlu dikaji hal-hal sebagai berikut: a) melakukan penelitian ulang dengan melihat hasil belajar matematika bukan saja dari segi isi, akan tetapi juga dari segi proses dan sikap matematika, b) melakukan kontrol terhadap variabel bebas di luar variabel yang diteliti dengan lebih ketat, seperti minat dan motivasi siswa, gaya belajar, cara berpikir, bakat dan kecerdasan, dan lain-lain, c) melakukan penelitian ulang pada lokasi atau jenjang sekolah yang berbeda, untuk mengetahui apakah hasil penelitian yang dilakukan sama dengan hasil penelitian ini, d) memilih guru pengampu mata pelajaran matematika dengan jenis kelamin atau jenjang pendidikan yang berbeda.

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EMPLOYABILITY SKILL TEACHING & DEVELOPMENT

Dra. Rita Susesty Husin

Abstract

Skill teaching development is part of many procedures of education. Development of education would be good if it has a good system , best employment skill in teaching and development, good facilities items for teaching method. There are some skills teaching and development which must have each teacher for example : The teaching skills(verbal instructions, demonstration, video/CD/DVD , digital teaching program/ USB, Diagrams, photo sequences). The learning phases : Fitts and posner (cognitive phase, associative phase, autonomous phase). The learning of physical skills requires that relevant movements to be assembled, component by component, using feed back to shape and polish them into a smooth action. Rehearsal of the skill must be done regularly and correctly. Modeling new skills for online teaching as well as the need to support "traditional" staff development, there is also a need to model the new teaching strategis and skills required for teaching. Development stages in teaching skills implication for teacher. Teaching skills development :In development teaching skills there are three workshops are planed to help prepare and communication barries (teaching communication skill. (development, teaching, skills).

Keywords : Fitts, posner, online teaching skills, digital teaching programs, teaching communication skills, development teaching online 3

Skill teaching development is part of many procedures of education. Development of education would be good if it has the teaching skills.

- Verbal instructions
- Demonstration
- Video (CD-DVD)
- Diagrams
- Photo sequences

5 The Learning Phases : fitts & posner

Fitts and posner (1967) suggested that the learning process is specific phases as we learn there are three stress to learning skills

1. Cognitive phase. Identification and development of the component parts of the skill-involves formation of a mental picture of the skill.

2. Associative phase. Linking the component parts into a smooth action. Involves practicing the skill and using feed back to perfect the skill.
3. Autonomous phase. Developing the learned skill do that is becomes automatic. Involves little on no conscious thought or attention whilst performing the skill not all performers reach this stage.

The learning of physical skills requires the relevant movements to be assembled , component by component, using feed back to shape and polish them into a smooth action. Rehearsal of the skill must be done regularly and correctly

Although reflection contributes to the personal growth of clinician – education and skills programs report it's used. Some faculties development program in theoretically grounded. Longitudinal model for faculty development of clinician education to promote reflective learning, learning effectiveness, evaluation design of education, facilitation learning environment, and perceived impact of participation. Perception of attitudes and behaviors towards learners and college.

The personal growth of clinician educations and is important for effective teaching. The faculty development program in teaching skills, first implemented in all model for faculty development of clinician education, comprises a set of conditions has paper describes the program and reports evaluation results for students. The students met with facilitations weekly for individuals. Education methods used across several content areas emphasized relative information provision, experimental learning with reflection and personal awareness comparison group measured changes in self assessed teaching and professional skills. A post only evaluation design appraised overall program quality, education methods and perceived impact of participation.

Program participants had significantly greather for all outcomes. Multiple teaching modeling indicated that program pre-post improvement in all outcomes except administration skills. Controlling for all characteristic. All measured programmatic characteristics were highly rated by students were rated significantly higher than information provision on personal awareness concentrate a positive impact of this alternative approach to faculty development on clinician ideas and behaviors towards learners and colleagues.

6 Teaching Tips

Preparing a lesson plan

Lesson planning procedures	Lesson planning for effective teaching
Sample lessons plan form (A)	(A) sample fill in the blank form
Sample lessons plan form (B)	Another form
Sample lessons plan form (C)	Another form

7 Teaching Techniques

7 Principles of good practice	Essentials of effective teaching and learning
Coaching subject and other academic	Our colleagues in another subject and

sports	others did not teach, they coach
Common teaching methods	Strengths and limitation of teaching methods
Common visual aids	Advantages and disadvantages of tips of visual aids
Encouraging student retention	Practical tips improving your teaching
Evaluate your own teaching	Reasons guidelines and resources
Good teaching	Personal qualities that make for good teaching
Grading practices	Strategies, minimizing complaints
A dozen teaching tips for diverse class rooms	Community college students face a particular set of challenges
10 rules of teaching in this century	Higher ed no longer has a corner on knowledge making and distribution
Selecting a delivery strategy	Choosing lecture, demonstration, or discussion

8 Professional ethics for teachers

UHCC statement on professional ethics (faculty)	Academic integrity is essential to the mission of the UHCC system
Code of ethics	(A) Indonesian code of ethics for education
Professional ethics in teaching	The training and development challenge

9 Critical Thinking

The foundation for critical thinking	Cultivation of for mainded critical thinking
The miniature guide critical thinking	A mini guide which focused on the essence of critical thinking concepts
The critical thinking community	A series of annotated web sites for educations interested in critical thinking
Critical thinking on the web	A directory of quality online resources
Critical thinking net	Critical thinking is reflective thinking focused on deciding what to believe or do

An introduction to critical thinking	Critical thinking is an important and vital topic in modern education
What is critical thinking?	Critical thinking includes a complex combination of skills
The elements of critical thinking	There are two essential dimensions of thinking that students need to master

10 Tools for student

College skills center	Information about the college skills center
Services for students	Support links provided for current students
Student tools and resources	What students, parents and teachers can do
Top web tools for college students	Ten tools recommended for every college student
Educational resources	Guide to online schools and much more
Free online course with english	Learn English free from the college
World wide learn	The world's premier only directory of education
University online	In demand associates, every degrees programs 100% online
Online education	Find the right college, your online education start here
Education encyclopedia	Resources for students in an education program
Career access	A comprehensive online, interactive job readness instructional tool

11 Getting organize as a teacher

Organize your self	Saving time and finding time
The teacher as an organizer	The whily and how organization for teaching

Tips for getting organized	Tips from fellow teachers to help you get organized
How to be an organized teacher	There is no better time saver than being organized
Getting organized	Organized teachers find that getting their work completed become much casier
15 ways for teachers to get organized	Plan and develop a system of organized

12 Feel good about teaching

- Good Teaching : why to student learn wore from some teachers than others than others ? check out these "good teaching" resource
- Love and the cabby: one persons good will can make a difference
- The true teacher accept all : the characteristic of a real teachers
- As good teacher must have models is methods of skill teaching and development as well as possible
- In this century the teachers should have good ability to make high digital technology for their lessons .performance of the lessons should be show in online systems so that their students can operated . their teaching tools by online .
- The 3 online teaching system should be cover the 3 procedures of teaching skills : development, teaching and skill.
- Every teachers should be teaching by digital program on their teaching process in education.

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APPLYING KNOWLEDGE SHARING IN ACADEMIC SOCIETY : ICT AND INCENTIVES EMPOWERMENT

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Abstract

One of the most difficult tasks in knowledge management is to distribute knowledge to the right people, or make the knowledge available at the point where it needed. It is relatively difficult by the organization members to share it optimally and appropriately, especially tacit knowledge. For a university, tacit knowledge is vital to the society because it the most important source of new knowledge, in the form of discoveries and innovations. It is the result of creative minds applying their tacit knowledge to overcome certain condition that need solutions.

In order to ensure the implementation of knowledge sharing, the academic society needed to be overcame the barriers are and incentives must be promoted. Standards in creation, structuring, dissemination, application of knowledge systems and technological tools should also applied as appropriate technical infrastructure within the society. With these practices, it can be expected that knowledge sharing process will be improved, and will bring advantages to the society.

Keywords: knowledge sharing, knowledge management, ICT, incentives

A. INTRODUCTION

Knowledge is considered as a critical organizational resource. However, one of the most difficult tasks in knowledge management is to distribute knowledge to the right people, or make the knowledge available at the point where it needed. It is relatively difficult by the organization members to share it optimally and appropriately, especially tacit knowledge. Explicit knowledge is easier to share than tacit one, since tacit knowledge form is usually abstract, because mostly it rest on the owner's mind.

An academic society, such as a university as a form of organization, it is mostly same as common organizations. For a university, tacit knowledge is vital to the society because it the most important source of new knowledge, in the form of discoveries and innovations. It is the result of creative minds applying their tacit knowledge to overcome certain condition that need solutions. Explicit knowledge performs important purposes in a university. It encodes past learning in artifacts and rules and facilitates coordination between disparate activities and functions in university. Also, employing explicit knowledge indicates technical skill and procedural rationality, and in turn helps the society to present a self-image of competence, legitimacy, and accountability. Cultural knowledge described as "the beliefs it holds to be true based on experience, observation, and

reflection about itself and its environment".[5]

B. PROBLEMS IN KNOWLEDGE SHARING

Ardichivili[6] investigated barriers that prevent the knowledge sharing in organizations. The most important barrier to sharing identified is that people are afraid that what they post may not be important, or may not be completely accurate, or may not be relevant to a specific discussion. The participants considered situation such as "fear to lose face", and of a fear to let the colleagues down, to mislead them, set them back from involving. Another barrier was: "People are not always clear on what information should be posted". The participants asserted the need for more clear directions for distinguishing between acceptable and not acceptable postings.

Another important barrier was related to the way the knowledge network is organized and managed. There are two major points in these barriers. First, the process of getting knowledge entries approved by managers is time consuming. Second, security and confidentiality considerations lead to self-imposed censorship.

Some organizations have tried to capture the potential of knowledge sharing among their members without prevail. These organizations fail to combine their incentive systems with their ambition of creating corporate value through knowledge sharing. While knowledge management technology is giving companies more sophisticated and easier ways to break the barriers, knowledge sharing still depends on people. Some organizations provide enough incentives, goals and technology for knowledge sharing. In these organizations, positive attitudes towards knowledge and knowledge work succeed. Other failed organization, individual knowledge is not seriously considered to be a vital corporate asset[7]. According to Swann et al.[8] networking as a social communication process, which encourages the sharing of knowledge among communities, is centre-stage in process. Organizations that really concern about the knowledge sharing should really consider the overlooked factors that determining its success.

A university, as a form of organization and society as well, also encounter problems in the sharing of knowledge. Library or libraries of universities as the source of knowledge storage should become the center of knowledge sharing process, in order to optimalize the knowledge distribution among the member of the university, or civitas academica. Some of the university libraries just performed the explicit knowledge sharing, but the tacit kind is still yet to be shared through the

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[5]Chun Wei Choo. *Information Management for the Intelligent Organization : the Art of Scanning the Environment* (Medford, New Jersey . Information Today, 2002), p. 24.

[6]Ardichivili, Alexander. Page, Vaughn. Wentling, Tim.. Motivation and Barriers in Virtual Knowledge-Sharing Communities of Practice (Kempston. *Journal of Knowledge Management*. Vol. 7. iss. 1., 2003), p.2

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university libraries.

C. INCENTIVES TO ENCOURAGE KNOWLEDGE SHARING IN ACADEMIC SOCIETY

In order to ensure the implementation of knowledge sharing, the academic society, needed to be overcame the barriers are and incentives must be promoted. According to Sharratt and Usoro[9], there are several factors in knowledge sharing, that can be employed as incentives to encourage knowledge sharing. Each factors are explained below:

a. Organizational Structure

Certain kind of organizational structure will ease the knowledge sharing implementation, while others not. A flexible, decentralized organizational structure encourages knowledge sharing, particularly of knowledge that is more tacit in nature, whereas organizations with a centralized, bureaucratic management style can restrain the creation of the new knowledge. Organizations with a flatter, less hierarchical structure may benefit from increased levels of knowledge sharing[10]. The first form of organization could be relatively smaller in scope of members involved in the community than the later, which will eased the sharing process and cut the unnecessary steps in the process, contrary with the other kind of organization.

For a university, library is a form of a unit should be empowered to encourage the sharing of knowledge. Explicit knowledge in form of books are stored and circulated for users who need information. The library can also provide consultation service of knowledge usage, such as information literacy service and trainings.

b. Technical Infrastructure

The state of technical infrastructure, in this case knowledge management systems, will affect the willingness of the users to use the system. There are two aspects of system can influence the motivation to knowledge sharing. First, the action must itself not be difficult to undertake. Second, the usefulness of the outcome of the action must be apparent. Also, the quality of information has been shown to indirectly affect participation in knowledge sharing. Information technology can improve knowledge transfer, however, it is limited in transferring explicit knowledge. Tacit knowledge still need direct interaction in transferring it [11].

The reference department and librarians of the library, if worked optimally, will help the users to get certain information and to use the technical infrastructure of the library. It is a form of knowledge sharing. However, it is important to note that the infrastructure itself in available, as information and communication technology (ICT) of this academic society.

c. Trust

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[9]Sharrat, Mark. Usoro, Abel. Understanding Knowledge-Sharing in Online Communities of Practice. (*Journal of Knowledge Management*, volume 1 issue 2. 2003) p. 67.

[10]*Ibid,* p.68.

[11]*Ibid.*

Trust has an important role in motivating knowledge sharing. If community members have mutual reciprocity in trust, honesty, reliability and commitment, there is likely to be a greater degree of motivation to participate and share one's knowledge. Someone is not likely to be motivated to share his/her knowledge with another individual or a community if he/she discriminate him/her to be dishonest or unreliable[12].

The relationships that encourage knowledge sharing develop over time based on mutual trust derived from a positive perception that there is equity and truth between both parties, which creates a willingness to share information on the expectation that something of equal value will be gained in return. The relationship between positive perceptions of the workers' psychological contract and their willingness to engage in knowledge sharing will be a two-way reciprocal process between attitudes and behavior[13]. Where members have positive experiences from knowledge sharing, this is likely to influence their attitudes towards the values of the organization. This process could influence the knowledge workers' willingness to exert overall effort on behalf of, and ultimately their willingness to, remain with that organization.

For example, an academic staff of this faculty is willing to share his/her knowledge to a colleague, such as sharing an unpublished research result, the colleague is expected to acknowledge that the source of the research data is from the staff.

d. Career Advancement

Positive association between knowledge sharing and career advancement is likely to motivate members to share their knowledge. In condition of appropriate incentives will most likely influence the behavior of employees in knowledge sharing[14]. Extrinsic rewards of this kind of incentives could be such as career advancement and financial incentives are another method motivating knowledge sharing. However, Herzbegr[15] believes that factors which are intrinsically rewarding, such as the work itself, recognition and reputation, had a far greater influence on an employee motivation. Nevertheless, knowledge sharing could be motivated by intrinsic reward such as sense of moral obligation, with greater influence rather than extrinsic rewards.

e. Sense of Community

This kind of incentive is a form of intrinsic motivation. The success of any knowledge management initiative is highly dependent on the workers' willingness to share their individual information, and those workers' attitudes towards knowledge sharing will be influenced by their perceptions of the fairness of their psychological contract with the organization. Such perceptions influence workers' willingness to stay or quit, and their overall commitment to the organization. The level of commitment will, in turn, influence their attitudes and behaviors to sharing their knowledge

[12] *Ibid.* p. 69.

[13] MacNeil, Christina M. Line Managers: Facilitator of Knowledge Sharing in Teams. Bardford: *Employee Relation*. Vol. 25. iss. 3, 2003) p. 121.

[14] Sharrat, *op.cit*., p.70

[15] *Ibid.*

for the benefit of the organization[16].

Knowledge sharing is likely to be motivated by moral obligation that results in a deeper sense of satisfaction than when motivated by extrinsic factors. Robertson and O'Malley Hammersley[17] states that workers who have high levels of job satisfaction and commitment to their organizations do so as a consequence of believing their organizations had included on the job responsibility.

In other words, if a person satisfies with his society, he will share his knowledge to other members of the society for the common welfare of the members.

D. KNOWLEDGE MANAGEMENT ICT TOOLS

Process of knowledge creation and capture are performed by both humans and software agents incorporated into tools. Knowledge creation is the formal process of acquiring the knowledge from the source and using a representation method for its capture. Knowledge capture is the process of inputting the acquired knowledge in the system using particular representation method. Several authoring software are available for knowledge capture. Bose [18] introduced some example of technologies for this category such as PC PACK, Wincite, Trellix, and Folio Views. PC PACK is a portable package of integrated tools for requirements and knowledge engineering.

The techniques of knowledge organization and storage contribute to the effectiveness of knowledge retrieval and distribution. Major techniques for organizing knowledge include categorization, indexing, standardization, and navigation. Several technologies for knowledge classification and indexing are available. The knowledge repository creation involves several processes, namely collection, summarization, organization and integration of knowledge across multiple information sources in an organization. Data warehouses using multi-dimensional database structures that let users analyze large amounts of knowledge from many perspectives are commonly used. Documents can be searched for, retrieved, and managed based on a combination of the meta-knowledge fields and full-content indexing. Example technologies for this category include Documentation, GrapeVine, Intraspect, and Aeneid.

In knowledge retrieval, advanced searching features are implemented, such as natural language searching, proximity searching, search by metadata fields, and concept searching. Users are able to set up search software agents for monitoring knowledge warehouses based on full text searches, knowledge map categories, author names and other metadata fields. Example of technologies for this category include WebIntelligence, SmartFinder, InfoSleuth, Intelligent Miner, IRIS, and Fulcrum Knowledge Network[19].

Distribution technologies automate the transfer of knowledge to users using publishing, or notification methods. Electronic mail has been traditionally used for this purpose, and emerging

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[16] Macneil, *loc.cit.*

[17] *Ibid.*

[18] Bose, Ranjit.. Knowledge Management Capabilities and Infrastructure for E-Commerce. Stillwater. *Journal of Computer Information Systems*. Vol. 42. iss. 5. 2002.

[19] *Ibid*.

Web-based technologies have better presentation, real-time updates and the ability to push applications as well as content for electronic publishing.

Assimilation technologies facilitate interpretation, summarization, visualization, explanation, and interactive exploration of time-oriented information and the multiple levels of meaningful concepts that can be abstracted from the information. These technologies help reduce the information overload problem of the user. An example technology for this category is KnowledgeX, which has a suite of knowledge management software that can be utilized individually or together for assimilation of knowledge.

These software are created mostly to be employed in knowledge management electronic systems. By using the same standards of processing knowledge and tools such as the these software programs presented, every users that access the systems will experience familiarity and systems friendliness that could encourage them to use the systems provided.

E. CONCLUSION

One of the most difficult tasks in knowledge management is to share and distribute knowledge to the right people, or make the knowledge available at the point where it needed. Knowledge sharing and distribution can mean either a centrally directed process of distributing knowledge among a particular group of employees, or it can be the transfer of knowledge between individuals, or within teams or working groups. Communication of knowledge is only possible between people who, to some extent at least, share a system of meaning.

The reasons that make people reluctant to contribute in knowledge sharing are various. The most factors that influence knowledge sharing is human related such as fear of posting an incorrect or misleading contribution, or the contribution may not be sufficient important or relevant, can have a significantly negative effect to motivate someone to share knowledge.

There are persistent barriers to workplace learning, such as for employees they usually view certain areas of their personal knowledge as part of their power base within the company, or as their private business. It will prevent the communication and sharing of knowledge between management and employees, or between employees themselves in teams.

To overcome the problems, the university management need to employ incentives and appropriate standards and tools to encourage the knowledge sharing activity within the society. Several incentives such as good organizational structure, trust within the knowledge community members, career advancement, and sense of community can be implemented in this case. Standards in creation, structuring, dissemination, application of knowledge systems and technological tools should also applied as appropriate technical infrastructure within the society. With these practices, it can be expected that knowledge sharing process will be improved, and will bring advantages to the society.

University libraries should also become the center of the knowledge sharing process. Services related to process can be provided by university libraries and its librarians, such as information literacy consultation and trainings.

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THE USING OF INSTRUCTIONAL TECHNOLOGY ON NON FORMAL EDUCATION TO CREATE EFFECTIVE MODEL OF TEACHING AND TRAINING

By La Ode Muharam

Abstract

This paper elaborates more about the use of instructional technology for education especially in non formal education. In the modern era with the force of the development of technology in some characteristics of the learning community and students are busy and the need of the world of job and industry need the competence and skilful personnel to fit the changing of the world. Therefore the need of technology for education is very urgent to solve the gap of output of formal and non-formal education with the need of world of job and industry. There are some model of the using of instructional technology that we can use. And instructional technology has some application for education process and training process.

Keywords:
instructional technology, non formal education, model of teaching and training

INTRODUCTION

In the 21st century there is a great changing in the learning paradigm that's from limited source of learning material become unlimited one. Where learning society as well as students can access learning materials needed independently through information's media especially through internet. It makes the function of tutor or instructor is not the only source of teaching and learning that communicates learning material needed for learning society or students but information technology can be as independent source of learning that provides many needs of learning material needed through online system. Thus, the function of tutor is more like as a facilitator of learning and training.

Instructional technology is not only as a tool in teaching and training, but also has become one of effective independent source of learning. This such condition stimulates all learning society and also students to be able to master and use the information technology (multi media and internet) well and on time

Instructional technology is not a luxury and rare tool as what happened in the 70s until the end of 80s, but the use of it effectively in non formal education institutions needs to be stimulated and evaluated continuously to generate an optimal learning and training situation. At the end of the process we hope it can improve the performance of the quality of learning and training and also relevant to the needs of the learning society and students.

The conditions of students in many non formal education institutions in our nation recently are vary and various. Weather in social, economic, culture or in intellectual competence skill point of view. Thus, model of non formal education must consider carefully the characteristic of learning

society's behavior and the behavior of the students. The condition of non formal education can create high motivated society to study and train. Si it needs support of the using of suitable instructional technology, considering the paradigm of the learning society and the students has already changed.

The needs of the learning society and support of instructional technology as media and source of learning in some non formal education and training will give a new situation in solving the gap between needs of world's job and quality of graduation from non formal education that become the partnership in building a competitive and profitable business. Phenomenon of jobless from the formal educated graduation of non formal education that can't be received in world job and business basically caused by irrelevant quality generated by this institution with the domain of world job needed by business and industry. One of the factor causes this condition is education process is not maximum and irrelevant curriculum with the needs of job world and industry that run dynamically. The other factors are unequal empowerment of instructional technology equipments (VCD, OHP, LCD, Computer, Laptop, Internet) as tools or media that can give added value in increasing the effectively of learning and training as well as the quality. While job world and world of industry need a skillful personnel that can plan and control the operating system of global business accurately by using those tools or media.

Manual works in global business system is an out of date system in this era. Therefore, society that study and train in non formal education institution must use instructional technology in many process of learning and training in order to they become skillful and can be accepted in job world. In fact, a women laborer that just works as a maid in foreign country need to understand the use of internet as one of effective global communication tools, at least she is able to use e-mail to communicate with her family. Without process of education and training by using media of instructional technology, it's hard for us to be aware of technology. The existence of non formal education for society to study at least must be able to overcome the gap created by formal education with the needs of recent job world and industry

Models of Learning by Information Technology/internet base

According to Haughey, 1998 in Sa'ud, there are three models of learning through internet that can ne considered as a basic to develop teaching and learning system, they are; (1) web course, (2) web centric course, and (3) web enhanced course. These three models can be applied in learning and training in non formal education.

Web Course, is the using of internet to the need of learning where all part of the learning material, discussion, consultation, task, exercise and test fully conducted through internet. But, communication among tutors, instructors and participants of training can be carried out anytime. This system is suitable with the condition of learning society and students in non formal education that have busy activities and certain works that unable them to carried out face to face learning and training system.

Web centric cource, where some of the learning material, discussion, consultation, task, exercise conducted by face to face interaction in the form of tutorial, but the percentage of face to face Is less compared to internet base. This method is suitable for learning society and students that have less mastery in using instructional technology. This lack can be solved through tutorial. Even

though teacher and students study separately, but in certain time tutorial can be done in the class room, library or in workshop room or any were agreed by all side. This is a dynamic model of non formal education that enable busy people but willing to improve their quality through long life learning.

Web Enhanced Cource, is the use of internet in education to support the quality of learning and training in the class. This model according to Sa'ud (2009) known as web lite cource. The main activity in this model is through face to face interaction in the class room. This model is very suitable in formal education and beginner of learning society that still need guidance in mastery instructional technology especially internet. Different with the previous two models, this model represent only little percentage of the using of internet. The main method in learning and training is through face to face. the function of internet in this model is to provide learning source that rich of information by providing address of make a link to some suitable source of learning and can be access online, to improve the quality and enlarge chance of communication among instructor, tutor and students, vice versa.

Relevance of Instructional Technology and Non fomal Education

In terms of the characteristics of instructional technology and non formal education have close relation in effort to increase the quality of learning and training out put. This is relevant with what has been declared by Sudjarwo S in Dewi S Prawiradilaga & Eveline Siregar as follows:

Component of Education	**Educational Technology**	**Non formal Education**
1. Perception toward students	1. there are two groups: a. Individual that has full time to study b. Individual that have time to study 2. Individual that: a. Independent and potential b. Able and more effective in learning independently c. Unique and vary from others	1. Individual that: a. most of the time is for working b. able to manage their self c. able to be more fun in learning independently d. don't like intervention in deciding their study
2.suitable learning method	Put priority on non conventional learning such as : independent learning, group of study/discussion. Long distance learning, case study	Due busy, independent learning, group discussion, long distance learning, case study are more suitable applied

3. Learning Sources	1. in the form of media of education such as :e-learning, media AV module, TV, radio, and computer interactive 2. Discussion based on characteristics of learning society or students	Using media of education such as : e-learning, media AV module, TV, radio, and computer interactive
4. Educator staff	Teacher or tutor has function as: guidance, motivator, and facilitator	Teacher or tutor has function as: guidance, motivator, and facilitator
5. Place of study	Very flexible : weather at school or out of school	Very flexible : can be inside of school, can be anywhere
6. Time of study	Very flexible: because it stresses on independent learning by using media of education	Very flexible : based on consensus and readiness of students
7. Length of study`	Follow the theory of mastery , doesn't rely on static and strict time	Follow the theory of mastery , doesn't rely on static and strict time
8. Scoring of learning result	1. the involvement of students in scoring is significant 2. focus on scoring by students itself (*self assessment*)	1. the involvement of students in scoring is significant 2. focus on scoring by students itself (*self assessment*)

The applications of Instructional Technology in Education and Training

The applications of instructional technology in non formal education cover two cases: (1) In learning/education process and , (2) process of training and apprentice

In the process of education, instructional technology can become as tool or media that can facilitate students or learning society to understand concept of theory that become the basic of the importance of learning, what do you learnt and why people study. While in process of training, instructional technology can become the media and learning source to master certain competences and skills that close related to the object learn. For example the utilization of interactive computer, internet, designing media through computer, producing multimedia trough flash et all. Or the application of technology of education to master certain skills related to the world job and world of industry.

The development of information technology has enrich the application of instructional technology in education field and training and has become choice that attract institution of non formal education in many countries to design short-term package of education and training for learning society or students in order to they can get certain skills. Weather in occupational skills or in vocational skills. By the skill they attain by the learning and training, that become important source for them to compete in the job world or induatry. Therefore, in the law of national education system no 20, 2003 article 26 emphasizes that:

(1) Non-formal education carried out by society that need service of education that has function as substitute, add, or complement of formal education in order to support long life learning purpose.
(2) Non-formal education functioned to improve potencies of students by stressing on mastery of knowledge and functional skills as well as attitude improvement and professional personality.
(3) Non-formal education covers life skill education, early childhood education, education of youth, education of women empowerment, education of equality, education of skills and workshop.training, and also other education that functioned to improve the students competences
(4) Unit of non-formal education consist of course institution, training institution, study group, society learning centre, majelis taklim as well as other institution that have the same characteristics.
(5) Course and training carried out by society that need knowledge, competences, and life skills as well as attitude to improve their self, improve their professionalism, work, own business and or continue their study to the higher level.
(6) The result of non-formal education can be equally accepted with the result of formal education program through process of equally evaluation conducted by authorized institution that has been delegated by government or local government by rely on the national standard of education.

Based on the rule of the above law, so it's clear that the target of non-formal education is the whole Indonesian citizens that need competences and skills that is not limited and conducted by the principle of long life learning. To attain that goals, support and role of educational technology is very important moreover in facing the competition of world job in the recent globalization era.

Conclution

The utilization of instructional technology in learning and training program of non formal education can create effective, conducive and challenging learning situations. Therefore, instructional technology is not only functioned as tools or media in learning and training, but laso has become one of effective and fun independent learning sources.

The using of instructional technology for learning society or students is very relevant with non formal education that is to create skilful personnel that are ready to competen to answer world challenges and world industry that always grow rapidly

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STUDIES OF BASIC ABILITY OF BASIC PHYSICS AND BASIC APPLICATION OF NUCLEAR TECHNOLOGY ON PHYSICS EDUCATION STUDENT

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Abstract

Competence of prospective teachers to master the material physics is physics that explains the concepts and principles of relativity, the theory of atoms and radioactivity and its application. The study aims to assess student understanding about the basic concepts of the application of nuclear technology (basic concepts, basic competencies, strategies, teaching materials, and view the benefits and impact of the application of nuclear energy for human life) with a written test and the achievement of the basic concepts of physics subject by using the document existing ones. The sample represents a total sample of all students of physics study program have passed the 2ndcourse physics of 75 people. The reseach concluded these: (1) to understanding the basic concepts of technology students compared with the ideal score is 400 on an average score of 303.24 or 76.03%, and (2) the correlation between the ability of student understanding of basic physics and basic concepts application of nuclear technology are 0.48. Implications of the research are necessary to model the deepening and enrichment material about basic concepts, principles, and application of nuclear technology that are applicable. Need to develop the structure, depth, contextual material basic concepts of physics are more applicable to perceived benefits in order to improve the welfare of mankind.

Keywords: nuclear technology and academic achievement

Pendahuluan

Calon guru fisika pada Program Studi Pendidikan Fisika harus mampu menguasai konsep dan prinsip secara umum pada Mata Kuliah Fisika Dasar. Mata kuliah itu memberikan fondasi yang kuat untuk mengembangkan penguasaan mata kuliah bidang studi lainnya. Mata kuliah itu erat kaitannya dengan standar kompetensi mata pelajaran fisika yang akan diajarkan oleh guru fisika di lapangan. Oleh karenanya prestasi mahasiswa pada mata kuliah Fisika Dasar akan terkait dengan kemampuan mereka terhadap penguasaan mereka pada konsep relativitas, teori atom dan radioaktivitas serta penerapannya dalam kehidupan sehari-hari. Bagian yang penting dari konsep, prinsip, dan penerapan radioaktivitas adalah pemahaman terhadap penerapan teknologi nuklir dalam kehidupan sehari-hari. Dengan pemahaman yang benar terhadap konsep penerapan teknologi nuklir diharapkan akan tumbuh sikap positif dan kritis terhadap berbagai program terkait dengan implementasi penerapan

teknologi nuklir di masyarakat. Sikap positif dan kritis ini diyakini akan berdampak terhadap program pemanfaatan teknologi nuklir bagi kesejahteraan manusia.

Namun kenyataanya, prestasi mahasiswa Program Studi Fisika yang telah mengambil mata kuliah Fisika Dasar masih rendah. Sampai dengan tahun akademik 2009/2010 rata-rata nilai dari 75 orang mahasiswa pada mata kuliah Fisika Dasar 2 sebesar 2,91. Dikatakan bahwa prestasi mahasiswa pada mata kuliah Fisika Dasar 2 masih rendah. Hal ini terlihat dengan hanya 18% mahasiswa yang memperoleh nilai A. Apakah rendahnya prestasi mereka pada mata kuliah Fisika Dasar ini akan menggambarkan kemampuan mereka dalam memahami bagian-bagian konsep, prinsip dan penerapan ilmu pengetahuan teknologi nuklir? Pernyatan ini perlu kajian yang lebih khusus terhadap kedua aspek.

Ada beberapa kompetensi dasar yang wajib dikuasai oleh mahasiswa calon guru fisika berkaitan dengan ilmu pengetahuan teknologi nuklir, antara lain: (1) kemampuan terhadap konsep dasar dan prinsip fisika nuklir, reaksi fisi dan fusi; (2) kemampuan memahami dan mengembangkan standar kompetensi dan kompetrensi dasar serta manfaat teknologi nuklir; (3) kemampuan memilih dan menggunakan pendekatan, metode dan strategi pembelajaran; dan (4) kemampuan menunjukkan contoh dan menjelaskan pemanfaatan (positif) dan dampak (negatif) penerapan tenaga nuklir bagi kehidupan manusia. Kompetensi dasar di atas sejalan dengan visi dan misi energi nasional, yaitu terwujudnya penyediaan dan pemanfaatan energi yang optimal, efisien dan rasional, terjangkau serta menghasilkan nilai tambah yang maksimal untuk mendukung pembangunan yang berkelanjutan (Batan: 2003). Selain visi yang terakit dengan pembangunan nasional juga diperkuat dengan misi yang opeasional, yaitu: (1) Menjaga kesinambungan ketersediaan energi nasional yang berkelanjutan (*security of supply*), (2) Memanfaatkan sumber energi secara efisien dan seimbang, (3) Memaksimalkan pemanfaatan energi bersih, (4) Mendorong pemanfaatan teknologi yang efisien, dan (5) Memberikan nilai tambah yang maksimal kepada negara program pemanfaatan energi. Namun tantangan visi dan misi energi tersebut adalah pada belum optimalnya pemahaman masyarakat. Salah satu upaya pemahaman masyarakat terhadap kebijakan energi nuklir ini adalah melalui proses pendidikan. Oleh karena itulah sosialisasi dan pemahaman teknologi nuklir perlu diawali dari mahasiswa calon guru mata pelajaran fisika. Muhammad Nur (2006), dalam penelitiannya menyimpulkan bahwa pemahaman teknologi nuklir pada para siswa sekolah menengah atas masih rendah. Pemahaman ini dapat ditingkatkan dengan menggunakan pembelajaran sains teknologi dan masyarakat (STM). Anna Poedjiadi (1989) menyatakan bahwa pendidikan sains harus mampu memberikan bekal kepada siswa tentang pengetahuan yang sesuai dengan perkembangan dan kemajuan sains dan teknologi, sehingga siswa siap untuk memanfaatkan hasil-hasil teknologi secara sederhana. Hal ini didorong dengan kenyataannya bahwa kemajuan teknologi yang begitu pesat dewasa ini menuntut siswa untuk dibekali tentang pendidikan sains yang ada kaitannya dalam kehidupan sehari-hari sejak awal. Implikasi dari pentingnya pembekalan teknologi nuklir di sekolah akan menuntut kemampuan guru fisika dalam menyampaikan iptek nuklir secara benar. Salah satu materi pembekalan teknologi nuklir bagi calon guru fisika terdapat pada mata kuliah Fisika Dasar 2.

Jika materi konsep dasar, prinsip, dan penerapan radioaktivitas pada mata kuliah Fisika Dasar dianalisis secara konstekstual, maka materi tersebut sangat berkaitan dengan bahan pembelakan bagi guru fisika dan upaya misi energi nasional, yaitu memberikan pemahaman terhadap pemanfaatan

teknololgi nuklir bagi kehidupan manusia. Diperkirakan akan terdapat manfaat yang signifikan di masa datang jika mahasiswa calon guru fisika memahami konsep dasar, prinsip dan penerapan teknologi nuklir secara tepat dan benar. Artinya, jika prestasi mahasiswa pada mata kuliah Fisika Dasar baik, maka ada kemungkinan tingkat pemahaman mereka terhadap konsep, prinsip, dan penerapan teknologi nuklir seperti misi kebijakan energi nasional akan baik.

Berdasarkan uraian di atas, maka penelitian dirumuskan sebagai berikut: (1) bagaimanakah gambaran prestasi mahasiswa pada mata kuliah dasar? (2) bagaimanakah pemahaman mahasiswa pada konsep dasar, prinsip, dan penerapan teknologi nuklir?, dan (3) adakah hubungan prestasi Fisika dasar dan pemahaman mahasiswa calon guru fisika terhadap pemahaman mereka dalam konsep dasar, prinsip, dan penerapan teknologi nuklir?

Sesuai dengan permasalahan penelitian yang dikemukakan di atas, tujuan penelitian ini adalah: (1) untuk mendapatkan data gambaran prestasi mahasiswa pada mata kuliah dasar, (2) untuk mendapatkan data pemahaman mahasiswa pada konsep dasar, prinsip, dan penerapan teknologi nuklir, dan (3) untuk mendapatkan data hubungan nilai Fisika Dasar dengan pemahaman mereka terhadap konsep dasar, prinsip, dan penerapan teknologi nuklir.

Hasil penelitian ini hasil diharapkan dapat: (1) memberikan sumbangan teoritis dalam pengembangan materi ajar mata kuliah Fisika Dasar; (2) memberikan informasi bagi para dosen, mahasiswa, para ahli pendidikan, dan para pemangku kepentingan tentang pentingnya keasadaran terhadap pemahaman konsep dasar, prinsip, dan penerapan teknologi nuklir.

Sebagaimana dilansir oleh Badan Tenaga Atom Nasional bahwa pemahaman masyarakat terhadap penerapan teknologi nuklir di Indonesia masih rendah dan belum merata. Hal ini menggambarkan pula masih banyaknya masyarakat yang bersikap negatif dan belum dapat menerima sepenuhnya terhadap pemanfaatan teknologi nuklir untuk kesejahteraan manusia. Sikap negatif terhadap pemanfaatan teknologi nuklir ini terutama menguat ketika terjadi kecelakaan pembangkit energi tenaga nuklir di Chernobyl dan beberapa PLTN di Jepang karena stunami beberapa waktu yang lalu. Sebagian masyarakat dunia menjadi antipati terhadap gagasan dan program pemanfaatan energi nuklir. Namun kondisi ini merupakan tantangan bagi pemerintah Indonesia khususnya yang telah menetapkan kebijakan program penggunaan tenaga nuklir sebagai alternatif sumber energi (Batan: 2003). Di beberapa kalangan muncul anggapan bahwa resiko negatif energi nuklir sangatlah besar dan seolah-olah harga mati. Apakah anggapan itu mutlak benar? Kita mengetahui dari data tahun 2006 bahwa selama 64 tahun terakhir terjadi 31 kecelakaan Reaktor Nuklir yang merenggut korban 539 orang, 186 diantaranya meninggal. Bandingkan dengan data kecelakaan lain yang ditunjukkan dalam kurun waktu 18 tahun terakhir ada 14 kecelakaan di Industri Kimia yang merenggut korban 64.652 orang, 4.287 diantaranya meninggal. Khusus di Indonesia dalam 5 tahun terakhir ada 76.866 orang korban kecelakaan lalu lintas, 54.733 diantaranya meninggal (30 orang/hari). Jadi, lebih bahaya PLTN atau sepeda motor? (Djarot, 2011).

Dari contoh uraian di atas, nampaklah bahwa anggapan terhadap dampak negatif teknologi nuklir terlalu dibesar-besarkan. Namun keuntungan yang diperoleh melalui pemanfaatan teknologi nuklir sangatlah besar. Dibandingkan dengan sumber energi yang lain, Energi Nuklir merupakan sumber energi yang paling tinggi kerapatan energinya (jumlah energi persatuan volume atau massa).

Satu kilogram uranium dapat menghasilkan energi sekitar 50.000 kwh (kilo watt jam), sedangkan 1kg batubara hanya dapat menghasilkan energi sekitar 3 kwh dan 1 kg minyak bumi hanya dapat menghasilkan sekitar 4 kwh (Djarot, 2011).

Reaktor nuklir tidak hanya digunakan untuk pembangkit listrik, tetapi juga digunakan dalam pembuatan radioisotop dan penelitian yang dimanfaatkan dalam bidang kedokteran, industri, biologi maupun farmasi. Indonesia sendiri memiliki beberapa reaktor nuklir yang digunakan untuk penelitian dan produksi isotop. Salah satunya adalah reaktor *Kartini* yang berada di Yogyakarta.

Metode Penelitian

Metode penelitian yang digunakan adalah metode deskriptif korelasional. Analisis dilakukan untuk menguji hubungan nilai Fisika Dasar (X) calon guru fisika terhadap pemahaman mahasiswa tentang konsep dasar, prinsip, dan penerapan teknologi nuklir (Variabel Y). Populasi dalam penelitian ini adalah semua mahasiswa yang aktif pada Program Studi Fisika pada sebuah Perguruan Tinggi Agama Islam yang jumlahnya 320 orang. Sampel dalam penelitian ini adalah mahasiswa yang telah lulus mata kuliah Fisika Dasar sebanyak 75 orang. Variabel kemampuan akademik mahasiswa direpresentasikan oleh nilai Fisika Dasar. Data diperoleh dengan menggunakan instrumen tes dan angket. Analisis data penelitian menggunakan metode statistik deskriptif (Creswell, J. W dan Clark, V. L. P.: 2007; Sambas A.M dan Maman A: 2007). Pada bagian terakhir, data dan kecenderungan data dianalisis secara kualitatif sehingga dapat memperkaya pemaknaan terhadap implikasi hasil penelitian.

Hasil Penelitian dan Pembahasan

Kemampuan akademik mahasiswa calon guru fisika

Berdasarkan data hasil penelitian tentang kemampuan akademik mahasiswa calon guru fisika yang diperoleh dari nilai mata kuliah Fisika Dasar, dapat disajikan seperti tabel berikut.

Tabel 1. Distribusi Nilai Fisika Dasar Mahasiswa Calon Guru Fisika

No	Kemampuan Akademik Mahasiswa (N=75)	Jumlah Mahasiswa	Prosentase (%)
1	Nilai A (4)	14	18,7
2	Nilai B (3)	44	58,7
3	Nilai C (2)	17	22,6
	Jumlah	75	

Perolehan nilai mata kuliah Fisika Dasar mahasiswa nampaknya berdistribusi normal. Jadi ada 58 orang atau 77,4% yang mendapat nilai sama atau lebih dari 3.

Kemampuan Pemahaman Konsep Dasar, Prinsip, dan Penerapan Teknologi Nuklir

Berdasarkan data hasil penelitian tentang kemampuan mahasiswa pada pemahaman konsep dasar, prinsip, dan penerapan teknologi nuklir yang terdiri dari empat komponen dapat diperlihatkan pada tabel 2 berikut.

Tabel 2. Distribusi Skor Kemampuan Mahasiswa Dalam Pemahaman Konsep Dasar, Prinsip dan Penerapan Teknologi Nuklir

No	Komponen	Skor Maksimal	Skor Minimal	Skor rata-rata
1	Konsep dasar dan prinsip fisika nuklir, reaksi fisi dan reaksi fusi	85	60	73,53
2	Standar Kompetensi dan kompetensi dasar serta manfaat teknologi nuklir	80	70	75,47
3	Pendekatan, metode dan strategi pembelajaran	85	65	73,93
4	Pemanfaatan (positif) dan dampak (negatif) penerapan tenaga nuklir	85	65	78,00

Keterangan: Skor ideal tiap komponen 100

Berdasarkan empat pertanyaan yang diisi oleh 75 orang mahasiswa, ternyata kualitas jawaban semua komponen berada di atas skor 70. Skor rata-rata tertinggi komponen yang dijawab mahasiswa adalah komponen pemanfaatan (positif) dan dampak (negatif) penerapan tenaga nuklir, yaitu sebesar 78,00. Jawaban dari pertanyaan butir 1 tentang konsep dasar dan prinsip fisika nuklir, reaksi fisi dan reaksi fusi cukup bervariasi. Sebagian besar responden menjawab konsep dasar nuklir, rekasi fisi dan reaksi fusi dengan mendeskripsikan definisi atau pengertian secara sederhana. Sebagian mahasiswa menguraikan konsep nuklir, reaksi fisi dan reaksi fusi disertai dengan penjelasan yang cukup lengkap. Namun ada sebagian kecil mahasiswa menguraikan konsep nuklir, reaksi fisi dan reaksi fusi disertai dengan penjelasan yang cukup lengkap dan gambaran proses terjadinya reaksi disertai dengan beberapa persamaan.

Jawaban dari pertanyaan butir 2 tentang Standar Kompetensi dan kompetensi dasar serta manfaat teknologi nuklir tidak terlalu bervariasi. Sebagian besar responden menjawab dengan menuliskan rumusan standar kompetensi dan kompetensi dasar yang bersumber dari dokumen KTSP. Responden menuliskan manfaat adanya kompetensi yang mengarah kepada penguasaan materi radioaktivitas pada mata pelajaran Fisika jenjang sekolah menengah atas. Responden menjelaskan

manfaat penggunaan radioaktivitas secara sederhana termasuk mengembangkan materi dengan arah pemanfaatan radioaktivitas dalam kehidupan sehari-hari. Penjelasan-penjelasan yang diungkap responden termasuk memadai.

Jawaban dari pertanyaan butir 3 tentang pendekatan, metode dan strategi pembelajaran konsep radioaktivitas dan teknologi nuklir tidak terlalu bervariasi. Sebagian besar responden menjawab dengan menuliskan rumusan metode ceramah dan diskusi. Hanya sedikit yang mengemukakan penggunaan metode simulasi. Padahal fenomena reaksi fisi dan fusi pada teknologi nuklir akan lebih menarik dan aman dengan menggunakan metode animasi atau demonstrasi visual. Hanya sebagian responden yang mengembangkan pendekatan dan strategi pembelajaran secara lebih rinci. Pendekatan pembelajaran untuk konsep teknologi nuklir yang dipilih dengan melakukan kunjungan ke Badan Tenaga Atom Nasional (Batan), pusat kajian atau penelitian pemanfaatan tenaga nuklir pada perguruan tinggi, bagian radiologi nuklir pada rumah sakit rumah sakit. Adapun strategi pembelajaran yang disarankan berupa kerja kelompok dan kajian individual serta pengembangan suatu proyek.

Jawaban dari pertanyaan butir 4 tentang pemanfaatan (positif) dan dampak (negatif) penerapan tenaga nuklir manfaat teknologi nuklir cukup bervariasi. Responden mengemukakan bahwa manfaat teknologi nuklir antara lain adalah untuk sumber tenaga pembangkit listrik (PLTN) dan membantu di bidang kedokteran. Sebagian responden yang mengemukakan manfaat teknologi nuklir dalam bidang rekayasa genetik, bidang pertanian, bidang industri, bidang komunikasi, dan bidang pertahanan. Sedangkan dampak negatifnya sebagian besar responden mengatakan bahwa kebocoran radiasi nuklir merupakan akibat paling merugikan dari penerapan teknologi nuklir ini.

Jika dilihat dari skor total kemampuan mahasiswa dalam menjawab konsep dasar, prinsip, dan penerapan teknologi nuklir, maka dapat dikelompokkan ke dalam tiga kelompok seperti ditunjukkan tabel 3 berikut.

Tabel 3. Distribusi Skor Total Kemampuan Mahasiswa Berdasarkan Rerata Nilai Fisika Dasar (N=75)

No	**Kelompok skor Total**	**Rerata Skor** (Ketercapaian)	**Rata-rata Nilai Fisdas**
1	Kelompok Tinggi (Lebih dari 310)	320,00 (80,90%)	3,47
2	Kelompok Sedang (310 s.d. 291)	302,52 (75,38%)	2,93
3	Kelompok Rendah (290 s.d. 270)	287,20 (71,80%)	2,64
	Rata-rata	303,24 (76,03%)	3,01

Keterangan: Skor ideal kelompok Tinggi adalah 400

Kemampuan mahasiswa pada kelompok tinggi, sedang, dan rendah yang menjawab empat pertanyaan tentang konsep dasar, prinsip dan penerapan teknologi nuklir berturut-turut dengan skor rata-rata sebesar 320,00, 302,52, dan 287,20 serta rata-ratanya 303,24 (76,03%). Ketercapaian jawaban mahasiswa terkait dengan konsep dasar, prinsip, dan penerapan teknologi nuklir terhadap skor ideal untuk semua kelompok berada diatas 70%. Urutan rerata skor dari ketiga kelompok diikuti dengan urutan rata-ra nilai mata kuliah Fisika Dasar yaitu 3,47; 2,93; dan 2,64 serta rata-ratanya 3,01. Kecenderungan skor kemampuan mahasiswa dalam menjawab pertanyaan konsep dasar, prinsip dan penerapan teknologi nuklir secara sederhana menunjukkan bahwa kelompok tinggi, sedang dan rendah berturut-turut menurun pada nilai Fisika Dasar.

Hubungan Prestasi Belajar Mahasiswa dengan Kemampuan Pemahaman Konsep Dasar, Prinsip, dan Penerapan Teknologi Nuklir

Berdasarkan pengolahan data penelitian prestasi belajar dan kemampuan pemahaman mahasiswa terhadap konsep dasar, prinsip, dan penerapan teknologi nuklir dengan menggunakan software statistik SPSS versi 16.0, maka dapat dideskripsikan sebagai berikut: (1) standar deviasi untuk rerata nilai Fisika Dasar dan kemampuan pemahaman terhadap konsep dasar, prinsip, dan penerapan teknologi nuklir masing-masing sebesar 0,65 dan 13,12 (2) terdapat hubungan antara nilai Fisika Dasar dan kemampuan pemahaman mahasiswa terhadap konsep dasar, prinsip, dan penerapan teknologi nuklir sebesar 0,483 atau katagori sedang.

Simpulan, saran, dan rekomendasi

Simpulan

Penelitian ini menyimpulkan bahwa teredapat hubungan antara prestasi belajar yang direpresentasikan dengan nilai mata kuliah Fisika Dasar dan pemahaman mahasiswa dalam konsep dasar, prinsip, dan penerapan teknologi nuklir mahasiswa pada katagori sedang. Pemahaman mahasiswa dalam konsep dasar, prinsip, dan penerapan teknologi nuklir bervariasi terutama pada variabel konsep dasar teknologi nuklir dan pemanfaatan dan dampak penggunaan teknologi nuklir dalam kehidupan sehari-hari.

Saran

Perlu diperluas dan diperkayanya materi fisika dasar yang menjadi pengembangan konsep dasar, prinsip, dan penerapan teknologi nuklir serta diperkenalkannya berbagai manfaat dan berbagai dampak positif dan negatif dari pengembangan teknologi nuklir dalam kehidupan sehari-hari. Perlu dilakukan kajian terhadap faktor-faktor lain (selain nilai mata kuliah Fisika Dasar) yang dimungkinkan berpengaruh pada pemahaman mahasiswa terhadap konsep dasar, prinsip, dan penerapan teknologi nuklir.

Rekomendasi

Adanya perubahan struktur dan kedalaman materi teknologi nuklir pada mata kuliah Fisika Dasar menjadi suatu keharusan. Langkah ini harus disertai dengan pendalaman aspek kontekstual pemanfaatan teknologi nuklir dalam semua aspek kehidupan sehari-hari. Pendalaman informasi ini dilakukan dengan terus memutakhirkan bahan berupa informasi aktual tentang penerapan teknologi tenaga nuklir dari lembaga penelitian dan pengembangan teknologi nuklir (seperti Batan). Masyarakat akan memiliki informasi positif dan memadai sehingga akan semakin tumbuh sikap positif meningkatkan kesejahteraan umat manusia melalui pemanfaatan teknologi nuklir ini.

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THE SEPCTRUM OF COMPETENCES AND PREPARATION OF TECHNICAL AND VOCATIONAL SCHOOL TEACHER IN INDONESIA

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Abstract

The research have a purpose to know in relation to (1) the Government policy in term of the number of students for SMK (Vocational) and SMA (General Education) in 2014; (2) The Teacher Institutions location in term of location to face the new SMK programs; and (3) The number of study programs of Teacher Institutions in term of their skill programs related to the skill competences spectrum. The findings show that Government of Indonesia policy dealing with the increase of number of students of SMA:SMK in 2014 to be 33:67 and has impact to the number of students and teachers. The number of teachers for SMK can be predicted is about 218,685 with about 121-150 study programs. It needs many teachers based on skills classification and adequate amount or sufficiency.

The public universities with wider mandate are located in Java, Sumatera, and Sulawesi and supported by some universities located in Kalimantan, Papua, and Maluku. There are 6 (six) teacher institutions are in Java, 4 (four) institutions are outside Java (Sumatera and Sulawesi), and 2 (two) institutions are in Bali and Sulawesi. On the other hand, amount of institute of teacher education (LPTK) in Indonesia is also supported by private sector to provide teacher for SMK with amount of around 214 institutions and spread over in all provinces. Based on findings and discussion, it is can be concluded that in relation of the amount of student and SMK until 2014 showing that the existence of comparison of SMK and SMA become 67:33 with spread of skills program at SMK. In general, there are about 40 study programs found at over study programs in SMK, but only 18 study programs available in LPTK (45%), while the rest (55%) do not have the programs needed. It is required to found solution for being dissolves in anticipating growth of SMK towards 2014.

Keywords: Technical and Vocational Teacher Education, Spectrum of Competences

A. BACKGROUND

Indonesia is one of developing countries is facing era of a global economy. This condition will necessitate the industry to be competitive within the regional as well the global markets, which in turn, forces Indonesia's capability to develop a long term plan for its human resources. The main issue is the question of which renewable resources should be preserved. The answer would be the skill, competence, and willingness of the Indonesian people. It is necessary to increase the added value of its human resources through education and training to upgrading the skill and competence of the young people who are entering the workforce as well as improving their skill and competence of the current workforce to be able to conform to technological and market changes.

Recently, national education system has facing many changes as a respond the challenge of globalization that stand on readiness for covering human resources in order to be able to live with various challenges and demand appropriate with characteristic of globalization. That is marked with existence of Legislation and Regulation of Government relate to education, for example National Education Act (UU No. 20/2003) about National System of Education, Teacher and Lecturer Act (UU No. 14/2005), and Government Regulation (PP No. 19/2005) about Standard National Education. In the Teacher Law (UU No. 14/2005) requires that all teachers, without exception, must have a four-year degree and professional teacher training (one year) to qualify for certification and the receipt of professional allowance. This requirement has impacted on the pre-service training sector significantly. Furthermore, for graduates of institute of teacher education and training (LPTK), a post-graduate professional experience qualification will be required to ensure that they are better prepared to be quality teachers.

The attention of Government of Indonesia to Technical and Vocational Education have important meaning. Policy and goals of Government of Indonesia for Technical and Vocational Schools (SMK) is through Roadmap Program of SMK 2006-2010 which is representing form of commitment to realize three pillars of national education that are (1) educational access, (2) quality, relevancy, and competitiveness, and (3) Reinforcement of management, accountability, and public image. Particularly, educational access policy for secondary of education is to increase number of SMK student. Comparison of general education (SMA) and vocational education (SMK) from initially is 70:30 becoming 33:67 in 2014 and to becoming 30:70 in 2020. Some support of Government of Indonesia in related to regulation such as Government Regulation of Republic of Indonesia No. 102/2007 about authentication of Convention on Technical and Vocational Education and also Decision of Director-General of Management of Primary and Secondary Education (Mandikdasmen), Ministry of National Education No. 251/C/Kep/MN/2008 about Skills Spectrum on Technical and Vocational Education.

In the decision of Director General of Mandikdasmen, specified by counted of 121 skills competences based on various study program at technical and vocational education. The decision tend to bring wide implication which of preparation of education infrastructure, especially in preparation of technical and vocational schoolteachers to anticipate growth and changes in technical and vocational education. In Indonesia, the preparation of teacher for technical and vocational school is yielded from Institute of Teachers Education (LPTK), conducted by government and also by private sector and spread over from North Sumatra province till Sulawesi North province. Problem faced in preparation of technical and vocational schoolteacher is study program inexistence in LPTK to cover teacher counted of 121 skills competences such as those which claimed by Government through SK No. 251/C/Kep/MN/2008.

According to skills competences spectrum, study and area program in technical and vocational secondary school (SMK) can be divided to 6 study area of skills, 40 study program (is merged into 14 study program group) and 121 skill competences. Whereas if looked other side from readiness of LPTK in fulfilling demand of teachers of SMK, currently there are difference which is high gap to request of the field. Changes of skills competences spectrum in SMK, is properly anticipated by LPTK as effort to produce qualified teacher to guarantee of preparation of teacher matching with request of school demand.

B. PROBLEM STATEMENT

Spectrum of Skills on Technical and Vocational Education (SMK) have been issued by Government of Indonesia through Directorate General of Management on Primary and Secondary Education, Ministry of National Education. Meanwhile LPTK as a producer of teacher including for SMK do not have all of study program such as those which is claimed in spectrum of skill to fulfill request teacher, especially teacher for SMK. Thus, is needed to identify amount and type of study program which have been and which not yet been owned by LPTK currently and how spreading of the study program to fulfill demand of SMK in the future.

C. OBJECTIVES AND RESEARCH QUESTIONS

The overall objective of the research is to explore ways to prepare graduates of pre-service teacher training institution in the context to face the new regulation in Technical and Vocational Education mainly is facing of Spectrum of Skills on Technical and Vocational Education. The main purposes of this study are to:

1. Identify spectrum of new skill competences in vocational secondary school in Indonesia;
2. Identify preparation of teachers for vocational secondary school;

3. Determine the linkage between competencies program in vocational secondary school and needed teachers for these competency programs.

This research also to examine the available of study program at LPTK currently and how many amount and type of study program are needed to anticipate request of SMK teacher based on spectrum of Skills on Technical and Vocational Education which have been specified. The objective to be achieved through answering the following questions:

1. How to relationship between the necessity skills program at SMK with the preparation of technical and vocational teacher?
2. How to prepare SMK teacher which there are no relevant program offered in LPTK?
3. How many necessity of teacher for SMK on 2014 in related to the regulation of extension of educational access?

D. RESEARCH METHODOLOGY

This research have a purpose to know (1) how wide of competency spectrum which have been formulated by Government through Directorate General of Management of Elementary and Secondary Education and its linkage to existing study area and will be developed by Vocational High School (SMK); (2) preparation of Vocational Teacher Institution in anticipating growth and extension of study area in SMK; (3) how far linkage between competency in SMK and teacher competency to fulfill competency program are needed.

There are 3 variables according to research questions, as the following:

1. The Government policy in term of the number of students for SMK (Vocational) and SMA (General Education) in next 5 years (2014);
2. The Teacher Institutions location in term of location to face the new SMK programs;
3. The number of study programs of Teacher Institutions in term of their skill programs related to the skill competences spectrum.

There are two phases to answer the research questions, review and analysis of literature and need assessments. The first phase is used secondary data were reviewed and analyzed by literature and documents including Government Acts and Regulation, and searched from the internet databases and experts reviews. The next phase, the study was looked a gap between amount of teacher need with existing condition of teacher provided by LPTK with available of each technical and vocational education type. Then, will be seen how many amount of teacher needed by SMK until 2014. Besides, study of literature is conducted by researcher to strengthen data which have been obtained directly

from result of interview. Study of literature is to get pictures about policy of government according to education directly, especially for technical and vocational education in the future.

E. LITERATURE REVIEW

The development of technical and vocational in Indonesia, especially Technical and Vocational School (SMK), is influenced by two factors, namely internal and external factors. The internal factor is the inversion of ratio of vocational school (SMK) and general secondary school (SMA). At the same time, it is required to improve the quality to meet the policy of government such as schools with international standard. The external factor is the nature of market work and the growth of domestic economy. The brief description of both is discussed as follows.

1. Strategic Planning for Vocational Education Up to 2014

The policy of national education in Indonesia up to 2020 showing the willingness of the government to extend the access of the students and the quality improvement of education in Indonesia conducted simultaneously. Extension of access in secondary education is inversion of student comparison between SMA and SMK from initially 70:30 to become 33:67 in 2014 and to become 30:70 in 2020. As the consequence, the vocational teacher institution is required to produce vocational teachers effectively. In a wider angle, the policy affects supply, demand, and placement of teachers.

When secondary education is dominated by general education, more teachers have educational background on science, mathematics, and economic social area. in contrast, if secondary education is dominated by vocational education the numbers of teachers need to meet the requirement. At vocational education, in addition to basic science, the teachers are required to master specific areas, like productive areas. The data of Directorate of Vocational Education (2007) shows that the ideal number of SMK teachers is as follows:

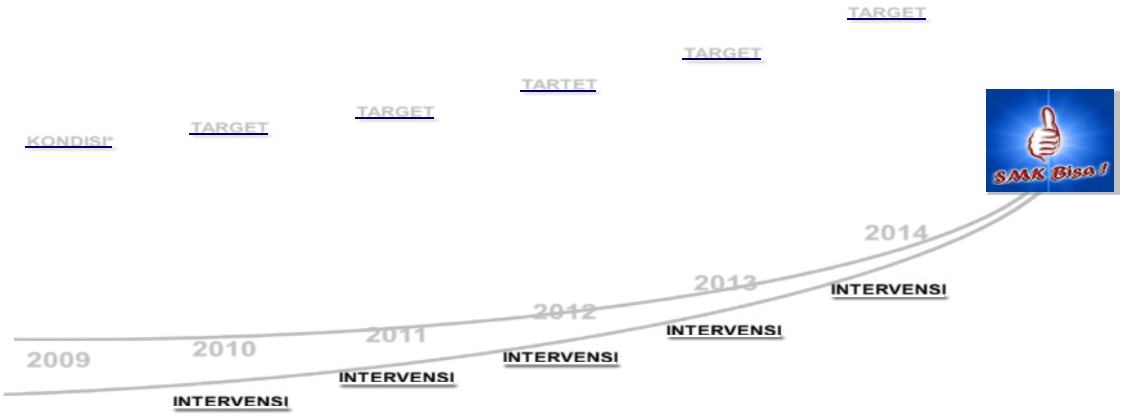


Figure 1. Road Map of Technical and Vocational School 2009-2014

In 2009, the number of SMK is 7719, then the ideal number of teachers for 3.878.652 students is 129.298 persons. In 2010, it is estimated that the number of SMK will be 8133 with the number of students is 4.397.988. Consequently, 146.598 teachers are needed. In 2011 there will be 8548 SMK, with number of students are 488.051 and the number of teachers needed are about 162.935. In 2012, there will be about 8963 SMK with the number of students is 5.363.617, and the number of teachers needed are 178.787. In 2013 estimated that the number of SMK will be about 9378 with number of students is 5921931, and the number of teachers needed is about 197.398. In 2014, it is estimated that the number SMK is increased to 9763 with the estimated number of students is 6.560.639, so that the teachers needed are about 218.615. using the estimation of the data, then the number of teachers of subject for adaptive, normative and productive can be traced with the assumption that condition of teachers is proportional with the number of hours in curriculum, then numbers of teachers will be counted by comparison of normative, adaptive, and productive teachers equal to number of hours for subject matter respectively.

2. Economic development

Growth of domestic economy can affect vocational education indirectly because they influence the competitiveness of the market work. Growth with linear condition can be seen at processing industry. In 2002, the nominal value is 400 billion rupiah and it gradually increases to 600 billion rupiah by the end of 2008. Processing industry have grown relatively slow because of solid capital industry.

Figure 2. Economics Development of Indonesia

The next rank of other domestic economic growth is service sector. Since 2002 this sector with 200 billion rupiah competing construction sector, and go up until 325 billion leaving the construction sector at 225 billion. Other significant growth of economics is in the sector of finance, rent, sale service and also communications transportation. Financial, rental, and transportation sector increase from initially 159 billion to almost 200 billion in 6 years; transportation sector and communications increase from 80 billion to 100 billion rupiah in 6 years. Mining sector and materials move to the medium level in 6 successively years because of the tightness of regulation of assurance.

Growth of domestic economics can affect vocational education road map indirectly. The demands for graduates from vocational education management and business remain the same because service sector are well-needed. The demands for labors in the middle level for hotel service industries, hospital, and hospitality are also very good. This is in line with growth of hospitals everywhere, accompanied by hotels that grow rapidly like mushroom in the rainy season. Stability of macro economy makes people mobile from one area to others and it has positive effect on tourism sector, transportation, and hospital. Besides, the demands for graduates for technology area such as information and communication technology or automotive also increase. Both areas are needed by telecommunication and automobile industry.

3. Labor Distribution

Labor distribution is almost the same as the growth of economics above, with the need of more detailed requirement of vocational energy. Industry based on agriculture, forestry, and agriculture remain to occupy position of labor that absorbs 40.000 in 2004 and more than 45.000 in 2008. Analysts indicate that enthusiasm of students to take agro industry does not excite and they go to other areas of study. Most of labors in agro sector are dropouts of school up to graduates from junior secondary education. It is due to the fact that the work in agro-industry sector does not need high skills even though they rely on unskilled worker and cheap worker

As shown in Figure-3, second absorption is held by commercial sector, hotel, and restaurant. This Industrial service is solid capital with high involvement of private sector. The demands for this sector have been identified since 2004 until 2008. Characteristics of commerce and service work (hotel and restaurant) need graduates from Business and Management and some of technology area with reliable and good quality of labor. As the result, it is expected that the LPTK need to open Business Management program.

Furthermore, the third rank is held by processing industrial sector, with absorption of around 10.000 labors in 2007 and increased to 12.500 labors in 2008. This sector needs labors from technology area, such as technology of processing agriculture, forestry, and fishery products.

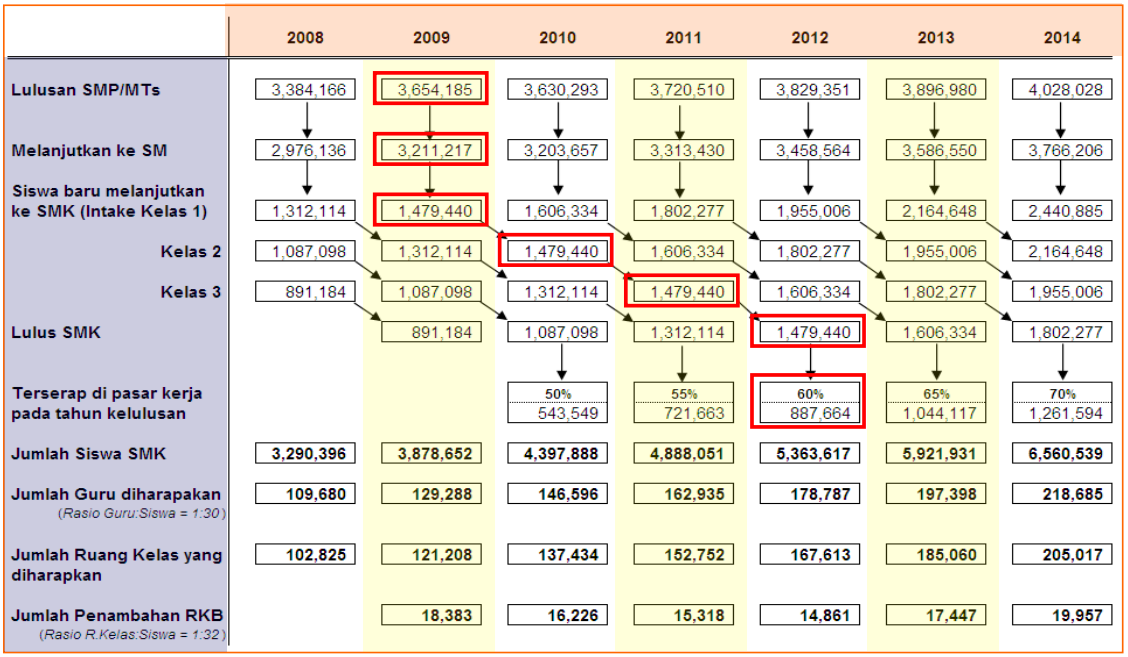
Ref. 3. Labor worker distribution (in thousand)

Figure 3. Labor Worker Distribution and Categories of Work

4. Mapping of SMK Student in Indonesia

The prediction starting from 2008 can be seen in Figure-4. It shows that the number of SMK students starting from 2008 to 2014 is estimated of 3.290.396 in 2008 and keeps increasing to 6.560.539 in 2014. On the other hand, the number of SMK teachers are expected to keep increasing from 109.680 (2008), 129.288 (2009), 146.596 (2010), 178.787 (2011), 197.398 (2012), and 218.685 (2013).

Projection number of SMK teachers until 2014 is almost two times with ratio student and teacher, that is 1:30. It can be interpreted that schools need twice the number of currently teachers in productive subject for each area of skills competences spectrum. Preparation of SMK teachers can follow and be based on trend of SMK students. As the result, LPTK needs to open some new study programs to anticipate demands for teachers in the future.



	2008	2009	2010	2011	2012	2013	2014
Lulusan SMP/MTs	3,384,166	3,654,185	3,630,293	3,720,510	3,829,351	3,896,980	4,028,028
Melanjutkan ke SM	2,976,136	3,211,217	3,203,657	3,313,430	3,458,564	3,586,550	3,766,206
Siswa baru melanjutkan ke SMK (Intake Kelas 1)	1,312,114	1,479,440	1,606,334	1,802,277	1,955,006	2,164,648	2,440,885
Kelas 2	1,087,098	1,312,114	1,479,440	1,606,334	1,802,277	1,955,006	2,164,648
Kelas 3	891,184	1,087,098	1,312,114	1,479,440	1,606,334	1,802,277	1,955,006
Lulus SMK		891,184	1,087,098	1,312,114	1,479,440	1,606,334	1,802,277
Terserap di pasar kerja pada tahun kelulusan			50% 543,549	55% 721,663	60% 887,664	65% 1,044,117	70% 1,261,594
Jumlah Siswa SMK	3,290,396	3,878,652	4,397,888	4,888,051	5,363,617	5,921,931	6,560,539
Jumlah Guru diharapakan (*Rasio Guru:Siswa = 1:30*)	109,680	129,288	146,596	162,935	178,787	197,398	218,685
Jumlah Ruang Kelas yang diharapkan	102,825	121,208	137,434	152,752	167,613	185,060	205,017
Jumlah Penambahan RKB (*Rasio R.Kelas:Siswa = 1:32*)		18,383	16,226	15,318	14,861	17,447	19,957

Figure 4. Students to Cohort

F. FINDINGS AND DISCUSSION

Based on results of focus group discussion and tracing related literatures to the availability of study programs at LPTK conducted by research team, it is obtained that:

Based on data showing that nowadays there are 7.568 SMK in Indonesia and 5.578 of them are private schools. It means that the ratio between private schools and public schools is 26%: 74%. The private schools grow from bottom as the community participation under the social, religious, and even business base. These kinds of schools are difficult to reform themselves. They seldom operate their schools well and have problems in distribution others. Most private schools teachers are not well paid, even below the minimum of national wages.

The next data show that vocational schools in Indonesia spread in 33 provinces, however they are not distributed based quantities and qualities. Most of the schools located in Java, 1128 schools (957 private, 171 public) in West Java, 1009 schools (838 private and 171 public) in Central Java, and 1037 schools (813 private and 224 public) in East Java. Some provinces have less than 100 schools, such as all provinces in Kalimantan, except West Kalimantan and all of provinces in Sulawesi, except South Sulawesi. Even some provinces less than 50 schools for newly established provinces such as Bangka Belitung, Gorontalo, and West Papua. Students with geographical disadvantages, outside Java have less opportunity to study in good schools.

Other data show that almost 60% of vocational schools are business schools, and the rest is technology base schools (such as machinery, electricity, electronics, civil works), and small numbers are specific departments (such as agro business and agro industry, multimedia, graphics, hotel and restaurant). On the other side, LPTKs do not educate teacher candidates on specific department. Most of LPTK have focused on technical and business management only. The back-fire of the enlargement of the educational issue in Indonesia, especially on vocational schools is the quantity and quality of teachers.

Some findings obtained based on literature study and interview on LPTK can be stated as follows:

1. Government policy dealing with the increase of number of students of SMA:SMK in 2014 to be 33:67. In 2014 it can be predicted that the number of SMK is about 9,793, the number of students is about 6,560,539, and the number of teacher is about 218,685. There are about 121-150 study programs in SMK. It needs many teachers based on skills classification and adequate amount or sufficiency.

2. The public universities with wider mandate are located in Java, Sumatera, and Sulawesi and supported by some universities located in Kalimantan, Papua, and Maluku. There are 6 (six) teacher institutions are in Java, 4 (four) institutions are outside Java (Sumatera and Sulawesi), and 2 (two) institutions are in Bali and Sulawesi.

3. Special attention is given to teachers supply for SMK, especially the ones opening group across skill program (e.g. business management to technology, agriculture into IT). There is a tendency of mixed business management with technology, technology with specific technology because of the demand of job market. There is a tendency for agriculture program to be closed because there is no student enrolled.

4. Special attention for SMK with skills program for art craft and other creative industries.
   a. Arts usually have less students and its difficult to grow.
   b. Creative industry usually is closed to the market location and tourism business.
   c. Not all universities provides teachers with skills on creative industry.

5. Attention for areas which are usually dominated by SMA is inverted to SMK.
   The change of school status from general school to vocational needs some new technical and vocational teachers. It needs at least 1044 hours for teachers in one skill programs such as productive subject.

6. Government involvement for some issues such as SMK teachers elevation in every territory.
   The relationship among teachers of universities, central government, and local government is in the aspect of supplying vocational teachers.

7. SMK Teachers with the Area of Competences.
   Related to the Skills Spectrum and the availability of study programs at LPTK can be described as follows:

   a. Industrial Technology and Engineering.
      Related to the skills spectrum on Technical and Vocational Education, there will be 18 study programs at SMK in the field of engineering and technology with amount to 66 of competences. Meanwhile, there are only 8 (eight) study programs (44%) are available in LPTK with 27 competences to fulfill study program in SMK. More than half that Study program is not available in LPTK, for example study program of Aero-plane Technology, Shipping Engineering, Textile Technology, Graphical Technology, Geology and Mining, Industrial Instrumentation, Chemical Engineering, Sea transportation, Industrial Technology, and Oil Technology.

   b. There are three study programs at SMK in the field of Information Technology and Communications with counted nine competences. Meanwhile, LPTK has only one study

program (33%) with four competences. There are two study programs do not available in LPTK, telecommunications and broadcasting technology.

c. All study programs at health area such as health and social nursing with six competences are not available in LPTK.
d. The area of Arts, Crafting, and Tourism at SMK are spread over to seventh study programs and 22 competences. LPTK have most of all study programs (86%) except design and production of textile, husk/skin, ceramics, metals, and woods.
e. Agri-business and Agro-technology area have seventh study programs with 14 competences, but LPTK do not have any study program related to this area.
f. All study program at Business and Management area are available in LPTK (100%), consist of three study programs such as administration, financial, and commercial trading area. There are four competences are include office administration, accountancy, banking, and marketing.

Table 1. The Area of Competences and Availability of Study Program at LPTK Based on Skills Spectrum on Technical and Vocational Education

Area of Study Program	**Group**	**Study Program(s)**		**Percent(%)**
		SMK	**LPTK**	
1. Technology and Engineering	Technology (66 Competences)	18	8	44
2. Information and Computer Technology	Technology (9 competences)	3	1	33
3. Health and Social	Health (5 competences)	1	0	0
	Social (1 competence)	1	0	0
4. Arts, Crafts, and Tourism	Arts (10 competences)	2	2	100
	Tourism (2 competences)	1	0	0
	Design and Production of Kria (5 competences)	1	0	0
	Home Economics and Technology (5 competences)	1	1	100
5. Agribusiness and Agro-Technology	Agribusiness (10 competences)	4	0	0
	Farming (2 competences)	2	0	0
	Forestry (1 competence)	1	0	0

6. Administration and Finance	Office Administration (1 competence)	1	1	100
	Finance (2 competences)	1	1	100
	Marketing (1 competence)	1	1	100

G. CONCLUSIONS

Based on findings and discussion, it is can be concluded that in relation of the amount of student and SMK until 2014 showing that the existence of comparison of SMK and SMA become 67:33 with spread of skills program at SMK. It has to follow with availability of the infrastructure and adequate of competence teacher or productive teacher his/her study program area.

However, data and information showing that LPTK is not yet ready to produce SMK teachers that meet the demands of the schools. From 40 study programs found at over study programs in SMK, only 18 study programs available in LPTK (45%), while the rest (55%) do not have the programs needed. So that, it is required to immediately found solution for being endless and dissolve, based on UU No.14/2005 and also Regulation of Government of No. 74/2008 about Teacher qualification stating that the minimum qualification of teacher is undergraduate (S-1) and relevant to subjects they teach.

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TECHNOLOGY VOCATIONAL EDUCATION BASED ON ECO-ETHICS OF ENVIRONMENTAL SCIENCE

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Abstract

In principle, science and technology can not have prevented its development, because it comes from a man wants a better, more comfortable, longer in enjoying life. Especially if we consider the fact that humans are now living in socio-technical conditions of an increasingly complex. The Role of Science in Environmental discusses the understanding of the underlying meaning of the environment influence human behavior in welfare and overall sustainability of livelihoods. The task of science should be able to simulate the natural environment with objects technology products.

Technology as a tool in supporting the development needs of technology-oriented environment with an efficient utilization of resources, effective and efficient. In addition selected resource replacement (substitute), which recovered back, which can be reused, and the levels of raw materials can be improved through biotechnology engineering, and so forth. It is important to integrate environmental science and technology-based education is the emergence of an eco-ethic that blends environmental ethic with ethics based on traditional ecological (curriculum environmental wisdom). This will formulate the continuity of science and technology in development in a broad sense and sustainability of natural and social systems to keep growing for the sake of present and future generations.

Keywords*: Environmental Science,, Eco-Ethics, Technology Education, Sustainability Development.*

Background

Knowledge should be able to answer the metaphysical challenge requires engagement, and openness that permeates the limitations of science. Morally, people with science knowledge it must develop an attitude of humility, that the size of human qualities are not solely based on its ability natural control, but also in terms of controlling himself. So realize also that science knowledge possessed by human beings merely a speck in the ocean vast knowledge of God.

We do not deny that science and technology has helped many people, but also not be ignored any negative impact. Of course the negative impact of science and technology should not make people

pessimistic even give up on these developments. Humans are not supposed trails only on science and technology, then so be a slave to technology. But science and technology must be in human hands or under human control. Science and technology developed by and for the welfare of humans, humans should not give up, even with his creation, but man must continue to face and ready to be responsible for what he has done.

Science developed at the beginning as theoria is to deepen understanding of human beings and nature around, so people can come to the core itself. While the technology on the other side continually developed to help human life and extend the hand of man. Science and technology concerns then shifts to the practical problems of human needs for survival and the desire to increase the possibilities presented life. Science and technology not only as a means to develop human beings in their culture but also the product of human culture itself, because the science knowledge and technology education is an important element for the development in the whole human culture, though not the goal and everything for human life. Science and technology with culture, both each intertwined.

Ethics is not included in the areas of science and technology that are autonomous, but there is no denying he was instrumental in discussions of science and technology. The application of science and technology requires an ethical dimension as consideration and the occasional visits would have an influence on the further development of science and technology education. Ethical responsibilities concerning the activities and use of science and technology where there is necessity to treat as attention to human nature, human dignity, maintain the balance of the ecosystem, responsible to the public interest, the interests of future generations (environmental friendly), and is universal. Therefore basically science and technology education is to develop and to strenght human existence and nature of human existence rather than to destroy.

This ethical responsibility is not to destroy the autonomy of science and technology, but even to as feedback for the development of science and technology itself, which will further strengthen as well as human existence. This is by Zubair (2005) will encourage people to seek solutions, and now it can be found on the development of science and technology to process and recycle (waste recycle for products) of some industrial wastes, so that human existence-no longer disturbed by some of the waste that endanger human existence as a result penerpan by human technology. This is in line with the role of Environmental Sciences (Environmenal Science), which combines human responsibility toward natural resources in harmony. Ethical responsibility of course does not forever prevent the development of science and technology and even reverse the burden of ethical responsibility to further spur the development of science and technology itself. Of course, human consciousness to understand the need to constantly raised. Technology that note, are intrinsically intended to free mankind from material affairs, but it seems that there is now new technology that consistently do a little role as liberator humans. Human with the technology looks more as a servant of technology than as a master.

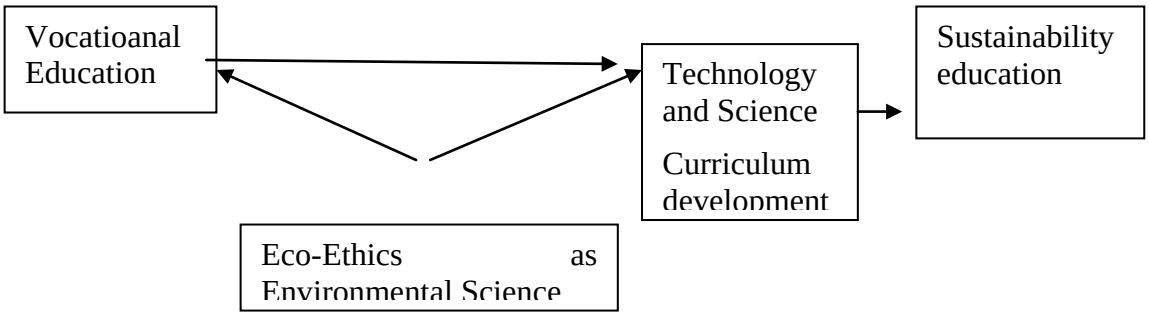
Discussion

Increasing population and free trade, making human needs such as economic improvement. to realize the goods necessary to compete and appropriate technology and human resources development. vocational education is the right program for science and technology transfer to humans. Application of technology will require a limited natural resource amount, the required knowledge and ethical life based on the so-called eco environment ethic. For welfare and fulfill a need quality human beings such as health, social, and education, science and technology do not have prevented its development, because it comes from a man wants a better, more comfortable, longer in enjoying life. Especially if we consider the fact that humans are now living in socio-technical conditions of an increasingly complex.

Role in addressing environmental science understanding of the underlying meaning of the environment influence human behavior in welfare rnaupun overall sustainability of livelihoods. According Moeloek (2005) the task of science should be able to simulate the natural environment with object-object technology products (human, animal, plants), their social environment (political, economic, management and so on) and cultural environment (customary law, and so forth).

Environmental sciences developed by the scientific paradigm and the scientific method. The paradigm of environmental science is a combination of natural law, theory, and applications using the instrument developed by order of humanity in a professional and scientific dimension. It is based on a holistic understanding environment as a whole system and entitisme, ie understanding which recognizes and accepts the existence of all producers in this life. While Sastraprateja (2005) says that the scientific method requires determination of environmental science or problems that are characterized by local (local specific) but to draw conclusions that apply macro-value for other regions through adjustments to the existing environmental setting in other regions, even in the whole region life on Earth. Next Soerjani (2005) explains that the order of the method of scientific research and environmental science begins fundamental: descriptive objective (whatever they are) followed by a character gives an account of causality and causal (explanatory) and ends with a conclusion that gives suggestions act (prescriptive).

Relationships in Environmental Sciences or interface with other sciences becomes clearer when we examine relation to space, objects, resources and circumstances, will include the intersection with the natural sciences, physics, chemistry, law of thermodynamics, and so forth. Also its relationship with the natural order as geology, mineralogy, climatology, hydrology, oseanologi, volcanology, and so forth. Furthermore Soerjani (2005) says with obvious living things relates to biology, microbiology, botany, zoology, biodiversity, and specifically in relation to humanity related to anthropology, psychology, sociology, economics, legal science, health sciences, and so forth.



Science and technology are considered as characteristic and modernity (Sastraprateja, 2005). But in fact science and technology as it develops when it has passed a long history. That which characterizes modernity now is not science and technology but spreading globally modern institutions that once accompanied by the ability of human reflexive. (Zubair, 2005) gives the term modernization is happening on Reflexive Modernization or radicalizing of modernity. Thanks to the accumulation of knowledge about ourselves and about the world, the world is now more open and more subject to change.

The link between science and technology can be seen in various perspectives. To show an increasingly close relationship between science and technology education use the term techno-science. The distance of time between the development of a science and technology becomes increasingly smaller beyond that as said Daniel Bell in Zubair (2005) during the last twenty five years there have been two changes. Change the first is the change of mechanical technology to the intellectual technology, the science-based technologies, such as computers are very dependent on the linguistic and mathematical. Changes concerning the role of both theoretical knowledge and the codification of theoretical knowledge in the development of innovation. The development of laser (light amplification by the stimulated emission of radiation), computers, semiconductors, microprocessors, based on theoretical knowledge. "Without awareness of this change, we can not understand the source of innovation and the importance of basic science in the modern world." (Zubair, 2005). At the moment, eco-ethics is attitude and behaviour for development technology which is indegenous culture (environmental friendly), so natural resources can be continuity and not distroy.

Humans (anthropocentric), Development, and Environmental Science Human behavior that affect the sustainability of livelihood and well-being referred specifically because of human behavior that dominates life in its entirety. It is possible due to excess with the natural human mind advanced (noosfer) compared with other living things. Human behavior was exactly what we need accountable because the overall impact of technological progress is the meaning of development which should become the foundation of livelihood sustainability. So development should be sustainable because of the demands of "time dimension" in the ongoing livelihood and welfare.

On the other side of welfare itself, human behavior must also be accountable for the welfare of other living creatures. But in fact this is precisely the lack of sufficient attention to us in the act. Unclear how the equation implied or inherent differences between economics, ecology, human ecology with environmental science. Environmental science is the science of the environment that explicitly highlights the human behavior that affect the sustainability of human livelihoods and welfare as well as other living creatures. What is underlined in the environmental sciences are not completely known in both the ecology, human ecology and economics. It is therefore clear that environmental science is the development, implementation (application) with the characteristics of ecological science, human ecology and economics with emphasis on the behavior, which means including the obligations, responsibilities and rights of human beings in this life. Science should accept the existence of environmental science with all the features and the paradigm, if science was included and receive progressive dynamics of science itself.

The development of science and technology aimed at improving human welfare, as the program development. Development is the embodiment of effort and human culture through the mastery and application of science and technology skills with social concerns, economics and culture in utilizing natural resources for sustainable livelihoods and welfare of self and society. So development requires support of natural resources exploited by human resources as development agents have (acquiring) science and technology education along with social concerns, economic, cultural and environmental knowledge is sufficient. For that is necessary for the level of science education, adjusted for yanq program entrusted to and required of him.

According Soerjani (2005) manufacturing industry which produces GDB contribution of 24.48% is actually only absorb manpower Indonesia amounted to 11.33% and the ratio% GDB and% labor is 2.16 (number sequence 4). This is because the advanced technology dipergunakannya more effective (not labor intensive) and technology from abroad, because in many ways the development of science and technology within Indonesia itself being left behind. Not to mention the fact that most of the profit of this industry must also be absorbed to pay royalties, debt and salaries of foreign workers. This manufacturing industry when it should be a continuation of the primary industries of agriculture who cultivated the value added by manufacturing small and medium enterprises that characterize agriculture with agro-industrial manufacturing. This can be realized in the processing of agricultural produce into jams, jellies, pickled vegetables, evaporation, dodol, chips and so on, either from farming or fishing.

Furthermore Soerjani (2005) says that the mining sector which produces 13.73% GDB in economic growth was only requires the absorption of 0.77% of Indonesian workers, with a ratio of% and% labor GDB highest (17.83). The reason according to Soerjani (2005) is almost the same as what happened with manufacturing industry. The mining industry is very sophisticated, for oil, copper, nickel, etc., technology (imports) also we have to pay expensive, also largely the result of the mine

must be processed and given the value added abroad. As a result the actual value as finished goods, no longer can we enjoy as a producer of raw materials.

This imbalance needs to groundbreaking policies that empower the farming community as the basic foundation of economic growth sustainable development (Atmanto, 2007). According to the Brundtland commission (Atmanto, 2007), sustainable development is "development that meet the needs of present generations without compromising (reducing) the ability of future generations to meet their needs." In addition it later emerged that supported restrictions on development that the World Bank. World Conservation Society (IUCN) and IUCN with UNEP and WWF, among others, emphasizes the socio-economic improvement, sustainable use of natural resources and attention on the carrying capacity of natural resources and biodiversity in the long term. In this connection by Pearce & Atkinson (1993: 65): in Soerjani (2005) are not considered sustainable development of Indonesia. As a description of the natural resources and technology education is the result of depreciation of Indonesia's natural resources by 17% of GDP, while only 15% its invesment.

The development is considered sustainable if it is new in the use of natural resources carried out economically, efficiently and effectively as possible. In addition it is necessary that the preservation of natural resources through creativity technology and art. Because if we eat has a value-added, then the result can be saved for future investments and protection. So it is clear that human resource capabilities to provide "value added" to support and development resources through the application of science, technology and art is the key to whether the development is carried out is "sustainable", or not. Unfortunately, the "movement" to help small and medium entrepreneurs are more meaningful as rhetoric than done with sincerity of heart is sincere. The tendency to drain and wasted natural resources, both biological and non-living should be limited to saving efforts, reject (refuse) hazardous materials or replace (replace ways) with ingredients that are safe, through reuse, extended life, repair strengthened or re-constructed (restrengthen) and or (reconstructs), recycling (recycle) and so forth.

In addition, except for savings and increased value and quality of products, also gained advantages that can not be valued in monetary (intangible) form of employment opportunities, improving skills through education and training, health, and so forth. With the wealth of Indonesia's natural resources are abundant enough in fact our society who are mostly farmers, cultivators, farmers, and fishermen should not be in poverty. They should get the opportunity of self-empowerment through vocational education and training to develop community based agro-industry which gives added value product. Farmers and fishermen are encouraged not to export or to export vegetables, fruits and seafood, but are empowered to produce products with added value, such as pickles, jams, chips, ketchup, chili sauce uleg, sambal bajag and forth in a bottle, evaporation, shredded fish, for -agar, dodol and so forth. Technology as a tool in supporting the development needs of technology-oriented environment with an efficient utilization of resources, effective and efficient. In addition selected resource

replacement (substitute), which recovered back, which can be reused, and the levels of raw materials can be improved through biotechnology engineering, and so forth. In addition to improved technologies that produce long-lived products, which do not manipulate the tastes of consumers with goods more attractive, but easily damaged or are dangerous to health. The technology we develop must be accompanied by prevention technology impacts occurring (impact cured technology with technology). Technology repair or rehabilitation and remediation technology in general need to be developed and disseminated. So to include most of the people, have developed technology to the people-oriented small and medium enterprises. Even if such industries will be developed "tiwul" an instant (fast food) should be developed cottage industry that includes farmers or entrepreneurs dried cassava as an actor and participants (stakeholders).

Technology-based vocational education is an important key to answer my curiosity as a basic human wisdom in behaving. Conduct that ensures the continuity of livelihoods and well-being packaged in a variety of programs that no matter how no arranging development in various sectors, but it comes down to the same on improving the quality of life. Therefore, as the perpetrators and our involvement in development, it must be able to adapt in various hues of dynamic environments.

Environmental education in the era of scientific progress and the ever-evolving technology must empower ourselves to be able to adapt in life that will always be turbulent. Therefore, environmental education should be able to empower people to rigid but also flexible enough with wisdom. to be able to produce a compromise in a variety of issues that require the approach of different dimensions. It is an impossibility that we exceed the time always contains something fun, occasionally we will have something that is troubling, also impossible if we keep it true, parla a time perhaps we do and make mistakes. The problem we face is to understand and reap the meaning of things that promote human to make mistakes, for the better future. Therefore, in dealing with life issues as the impact of the development of science and technology, it would require the nation's children equipped themselves with a variety of education, to stimulate themselves with skills but also with social care and wisdom. This is called human or social responsibility to corporate social responsibility (corporate social responsibility).

Conclusion

Science and technology education are ideally supposed to order in two things: make a humble man because it provides clarity about the universe and the application of technology education, both a reminder that we are still stupid and still much to be known and studied. Science and technology knows no bounds, as long as humans themselves are aware of its limitations. Science and technologi unable to solve human problems is absolutely. But science and technology education is very useful to humans. Technology as a tool in supporting the development needs of technology-oriented environment with an efficient utilization of resources, effective and efficient. In addition selected resource replacement (substitute), which recovered back, which can be reused, and the levels of raw materials can be improved through biotechnology engineering, and so forth. In addition to improved

technologies that produce long-lived products, which do not manipulate the tastes of consumers with goods more attractive, but easily damaged or are dangerous to health. Educational technology that we develop must be accompanied by prevention technology impacts occurring (technology impact cured with technology) and environmental ethics education for sustainable development.

From the discussion above, it can be important to integrate environmental science and technology-based education is the emergence of an eco-ethic that blends environmental ethic with ethics based on traditional ecological (environmental wisdom). This will formulate the continuity of science and technology in development in a broad sense, as a sustainable technological capability of the natural and social systems to keep growing for the sake of present and future generations.

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A STUDY ON DETERMINING FACTORS IN HIGHER EDUCATION SYNERGETIC COOPERATION IN THE PREPARATION OF VOCATIONAL TEACHER EDUCATION

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Abstract

This study aims at identifying determinant indicators for success in the implementation of synergetic cooperation scope in the preparation of vocational teachers. Population of the study includes all cooperation partners of Universitas Negeri Jakarta. Twenty ―five industrial, eight educational, five government and eight non-government― institutions have been selected as subjects of the study through purposive random sampling. Questionnaires were used to collect data for the study. Expert Judgment has been employed to determined validity of instrument and alpha test for reliability. Findings indicate a capital resource aspect of 0.741, human resource aspect of 0.813, and cooperation management resource of 0.781.

Descriptive analysis of obtained data reveals that, in implementing synergetic cooperation scope for the preparation of vocational teachers, the role of cooperation partners is required in the following: (a) capital resource aspect (mean= 2.78, sufficient role); (b) human resource aspect (mean= 3.15, very effective role); and (c) management aspect (mean= 3.85, very effective role). Dominant indicators for capital resource aspect include the role of partner in determining success of cooperation include the use institutional use of capital resources, existence of shared responsibility for risks of damage, and procurement of accurate data and information base. For human resource aspect, dominant indicators include providing experts to represent institution, providing professional management staff and highly committed institutional leaders. For management aspect, on the other hand, the indicators include establishing institutional policy to support partnership activities, creating conducive partnership environment, establishing plans based on shared needs, clear distribution of tasks and responsibility of each related party, organize official involvement of resources, and performing continuous monitoring and evaluation.

Key-words: synergetic cooperation, capital resource, human resource, cooperation management.

A. INTRODUCTION

Vocational and technology education (VTE), both implemented in formal and non formal education, is an integral part of the National Education System. The education has direct relationship with the industrialization process, particularly related to its function in preparing industrial labor force who

have the skills or competence in their respective field so that they are ready to compete in the global job market.

Success of a vocational education institution in achieving its intended goals requires complete instructional media, sophisticated practicum tools, sound curriculum, and other instructional facilities. In addition, it is also dependent on the human resource responsible for managing the institution, particularly the teachers.

Teacher Education Institutions (TEIs) play an important role in assuring quality of their graduates (prospective teachers) before they enter their career in VCE. One effort that can be done to improve quality of graduates is by performing partnership with both domestic and overseas Higher Education Institutions (HEIs) and the industry.

It is assumed that all HEIs that prepare teachers, including Universitas Negeri Jakarta (UNJ), has performed strategic cooperation supportive to institutional partnerships that aim at education quality improvement and balanced standard of education quality both in national and international context.

Implementation of synergetic cooperation scope is influenced by two major factors; i.e. internal and external factors. Internal factor requires integrated performance of related units at university level down to study programs. So far, synergetic performance across units of the university sub system has not yet existed. Some are not even linked. Consequently, performance of all the units in implementing cooperation scope cannot yet meet the intended objectives. External factor, on the other hand, is determined by synergetic cooperation between the university and its partners; yet, not all universities are successful in establishing partnership. In search for answer to the problem, there is a need for a systemic analysis in determining comprehensive action that can completely solve the problem. Such comprehensive action can be initiated by investigation, exploration and identification of areas within the scope of cooperation that one or more partner-related units fail to manage.

For the purpose of implementing the scope of cooperation, identification of feasible activities is necessary. On the other hand, to better understand the mechanism of cooperation to be carried out by the academic members, there is a need for information on the cooperation mechanism, system and procedures existing in the university to be shared or made public.

Based on the above discussion, it is necessary to indentify factors perceived by cooperation partners as determinant to successful synergetic cooperation in preparing quality VCE teachers.

B. THEORETICAL FRAMEWORK

1. The Preparation of VCE Teachers

In the discourse of vocational teacher education and training, there are three major topics of research; i.e. recruitment, training and work of vocational teachers.[20] There is one thing that should be given

[20] Grollmann, P. & Waldemar, B. 2008. "Technical and Vocational Education and Training Research for the Professionalisation of Vocational Teachers." In Felix Rauner & Rupert Maclean (Eds.), *Handbook of Technical and Vocational Education and Training Research*. Springer, Dordrecht: 2008, p. 385.

attention in the training and education of vocational teachers. It is the requirements or competences required to be VCE teachers. Ones that are supported by theories obtained from empirical studies. Grollmann and Bauer suggest that (1)

Grollmann and Bauer further assert that (1) most teachers perceived practical experience as skilful labor or engineer is more important for teaching than knowledge obtained from college study, (2) vocational teacher should be relevant to the context of school teaching and real life, (3) vocational teacher professional and competence development should be carefully thought and performed, (4) the process of professionalizing of vocational teachers is about individual development following teacher completion of vocational education and training.

In the process of professionalizing vocational teachers. Grollman and Bauer identify two issues: (1) vocational school experience a shift in their role with regards to policies on vocational schools and requirements for vocational teachers, and (2) empirical findings related to teacher training has led to questions about the influence and/or contribution of such training on the formation and development of teacher competences.

On the other hand, Dybowski and Dietzen states that vocational education and training and organizational development in companies are two hot issues.[21] The issues emerged as the results of principal structural changes in the business world. Such changes were triggered by the economic crises experienced by many countries during the year 1992/1993. The crises has led to sociological debate on (1) inflexible bureaucracy and hierarchy in the industry world, and (2) the influence of work division within the company of vocational training and education with distinctive work divisions orientation.

Therefore, according to Dybowski and Dietzen, vocational training and education are related to two things: (1) dynamic innovation process and organizational development in modern ventures must be adopted in the vocational training and education system, and (2) expertise in existing fields of work should be made the stepping stone towards development of organization and performing innovations in structure of ventures.

The above discussion signifies that relevance of vocational teacher training and education with development in the business world is a necessity.

The development of dynamic business needs to be responded in a paradigmatically and systematically by policy makers in education and training (preparation) of vocational teachers. Moreover, cooperation between vocational teacher education and training institutions and companies become an inescapable necessity. And, to build successful cooperation, it is necessary to identify the determinants of job success.

2. **Higher Education Cooperation**

[21] Dybowski, Gisela & Agnes Dietzen. 2008. "Vocational Education and Training and Organisational Development in Companies." In Felix Rauner & Rupert Maclean (Eds.). *Handbook of Technical and Vocational Education and Training Research*. Springer. Dordrecht: 2008, pp. 392-393

Cooperation is a conscious joint effort undertaken with mutual support and mutual reinforcement to achieve sound synergy.[22] In general, cooperation between universities aims at mutual improvement and development performance of respective HEIs that collaborate with a view to maintaining, nurturing, empowering, and developing science, technology and/or art. Cooperation activities can be done through the management of HE, educational activities, research activities, and community-service activities that include one or more areas of science.

According to Minister of Education Regulations Article 6 - 8 on HE Quality Assurance System (SPMPT), cooperation activities include the management of universities, education, research and/or community service[23]. Furthermore, it explaines that HE cooperation can take the following forms: (1) management cooperation may include collaborative program implementation and establishment of new programs, (2) twinning program, particularly established in collaboration by domestic and overseas universities with a view to equal recognition of graduates, (3) double-degree (dual-degree) program, organized in collaboration with overseas universities for programs that differ in both academic and vocational levels, (4) CreditTranfer System (CTS), which is a shared-recognition between cooperating universities on certain program courses; (5) Cooperation in Research, this includes the following activities: (a) research management, (b) research implementation, (c) the research development, (d) the application of research findings including dissemination and publication of research, (6) Lecturer and Student Exchange in conducting academic activities; deployment of lecturers/experts; (7) Utilization of resources in the implementation of academic activities, research and community service; (8) Publication of scientific papers, writings or works of one college in accredited scientific journals of others in different countries; (9) Other scholarly activities such as collaborative scientific conferences, forums and seminar; (10) Cooperation in the provision of scholarships or internship activities. [24]

A study in HE conducted by PPA consultants sponsored by the Public and Private Sector Partnerships (PPSP) of TPSDP/DGHE (2002) recommends 7 (seven) partnership models that include (1) Nurturing, (2) Twinning, (3) Joint Research, (4) Resource Sharing, (5) Training, (6) Community Development, and (7) Build Operate and Transfer. In addition, 2 (two) new models are recommended: *equal partnership* and *empowerment*[25].

Models are selected by HE institutions by considering problems, shared goals/objectives, capital, and existing resources of each respective HEI. Thus, the form of cooperation is very much dependent on parties involved in the cooperation.

3. **Determinants of Successful Cooperation**

Cooperation (collaboration) is a group activity carried out by professionals or teams in the form of cooperation with experts of diverse disciplines with a range of expertise and responsibility. This

[22] DGHE. 2008. *Sistem Penjaminan Mutu Perguruan Tinggi* (HE Quality Assurance System). Jakarta: DGHE MONE
[23] Ibid pp. 304.
[24] Ibid pp. 304-305
[25] **PPA Consultant. *Public Private Sector Partnership: Final Report*. Jakarta: Ministry of National Education. 2002,**

cooperation is a collaborative designing process with a view to suitable solution design[26]. Cooperation in big projects commonly involves a great number of experts or groups relevant to the project.

Cooperation involving many experts of diverse fields demand the trust, mutual respect, shared vision, intensive communication, and flexibility. Successful cooperation is determined by five elements: (1) values and quality of each group or member, (2) brainstorming, (3) communication, (4) teamwork and leadership (, and (5) ownership and partnership[27].

Shin further explaines that, as this partnership involves participants, they assume clear and specific roles or responsibilities in supporting success of the cooperation. Students should be highly qualified and skilful in their respective disciplines. Faculty assumes primary responsibility for the seeking of opportunities for establishing collaboration and developing interdisciplinary teams. Sponsors primarily serve to provide feedback, critique, and professional technical support to be partners rather than clients. In other words, successful cooperation is a shared responsibility of parties involved.

Cooperation in the preparation of teachers need to be supported by adequate human resources (HR) and funding. Human Resources includes the teaching staff ―professors and teaching assistants― admission and supervision staff. Available funding is utilized to support international research and teaching activities. These funds are also allocated as scholarships for students. In addition, it is used to support mobility of teaching assistants, lecturer exchange, as well as activities communication and promotional activities[28].

On the other hand, Tamtik identifies factors supporting to successful performance of institutional network[29]. These factors are of three categories: institutional, network, and institutional and networkg as a whole. Institutional factor plays the role of provider of resources and accesses resources owned by the other institutions. Institutional network can help suppress operational costs. The network will provide optimum benefits when the number of network members is limited. Relationship among universities played a principal role in the network operation practices. Communication, organization and commitment of the network becomes imperative factors in creating optimum cooperation.

C. METHODS

This needs analysis study employs a descriptive-quantitative approach. It was considered to be more suitable in identifying indicators supportive to cooperation implementation so that more clear and detailed explanation of existing problems can be expected. Needs analysis is deemed necessary to

[26] Dosun Shin, "Design Collaboration" http://www.iasdr2009.org/ap/Papers/, p. 2922.
[27] Ibid.
[28] "International Strategy of The University of Lausanne", RI UNIL 15 October 2009.
[29] Tamtik, Merli. 2009. "*An Analysis of the Factors that Enhance Participation in European University Networks*: *A Case Study of the University of Tartu.*" Theses. Educational Theories and Policy Studies Study Program. Ontario Institute for Studies in Education. University of Toronto. p. 2

obtain information on the breadth and depth of needs emerging in efforts for implementing the scope of synergetic cooperation.

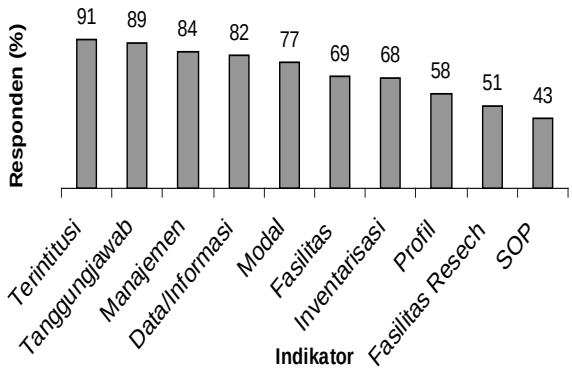
Respondents of this study include all partner institutions of UNJ. Each institution is represented by two representatives. 20 partner institutions were managed to be accessed, they consist of five partners representing the business/industry sector, eight partners representing the HE/educational institutions sector, five of the government, and two of the non-government.

D. FINDINGS AND DISCUSSION

1. Findings

Findings of this study are presented and discussed based on three aspects: resources, human resources, and management. They are manifested in the indicators of support for the scope of cooperation implementation. Each aspect consists of 10 indicators so that, overall, there are 30 indicators.

Capital Resource Aspect



Picture 1. Respondents' Perception of Capital Resource Aspect

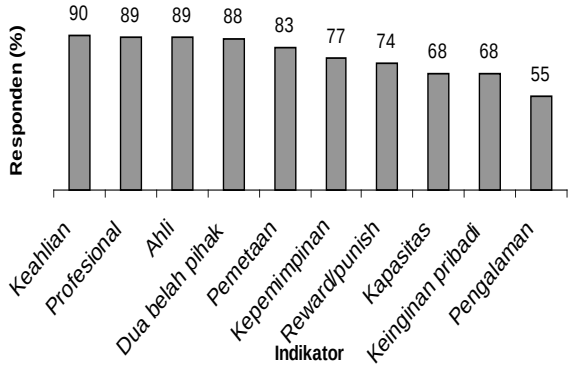
Twenty partnership respondents of the study assign an average score of 2.78 for Capital Resource Aspect with a top score of 3.67 for '*the need for resources to be utilized institutionally.*' The lowest score obtained for this aspect is 1.72 for '*the need for SOP on utilization of resources of both parties involved (in the cooperation).*'

Findings ranked by criterion can be presented as follows: (1) The need for resources to be utilized institutionally obtained 91%; (2) *The need for shared responsibility on risk of damage on resources of each respective party* obtained 89%; (3) *The need for management of resources utilized by both parties* obtained 84%; (4) *The need for accurate information and data base* obtained 82%; (5) *The need for capital specially prepared for partnership* obtained 77%; (6) *The need for physical facilities to be properly managed for partnership activities purposes* obtained 69%; (7) *The need for an inventory of resources utilized by both parties* obtained 68%; (8) *The need for a profile of resources utilized for partnership activities* obtained 58%; (9) *The need for standards of adequate*

research facilities on both parties obtained 51%; (10) *The need for SOP on utilization of resources of both parties* obtained 43%.

Human Resource Aspect

Twenty partnership respondents of the study assign an average score of 3.15 for Human Resource Aspect with a top score of 3.60 for '*the need for availability of experts as institutional representatives.*' The lowest score obtained for this aspect is 2.22 for '*the need for involvement of HR with relevant national and international experience.*'

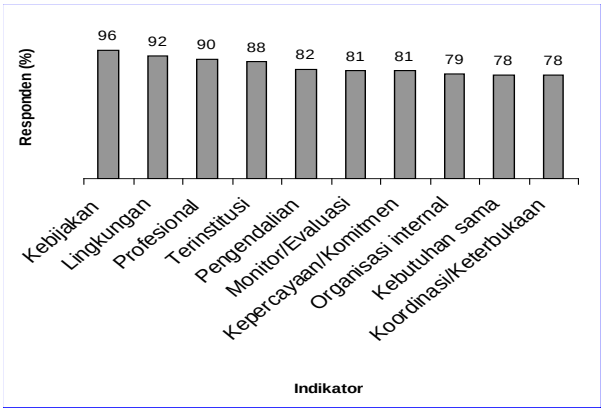


Picture 2. Respondents' Perception of Human Resource Aspect

Findings ranked by criterion can be presented as follows: (1) *The need for availability of experts as institutional representatives* obtained 90%; (2) *The need for professional management staff* obtained 89%; (3) *The need for involvement of experts from both parties* obtained 88%; (4) *The need for proportional involvement of HR from both parties* obtained 88%; (5) *The need for a map of HR involved in the partnership program* obtained 83%; (6) *The need for strong and highly responsible leadership* obtained 77%; (7) *The need for reward and punishment mechanism for people involved in the partnership* obtained 74%; (8) *The need for involvement of all staff on both parties with regards to their respective capacity* obtained 68%; (9) *The need for the partnership to be free from personal interests and/or dominance or double-standard practices* obtained 68%; (10) *The need for involvement of HR with relevant national and international experience*' obtained 55%.

Management Aspect

Twenty partnership respondents of the study assign an average score of 3.15 for Management Aspect with a top score of 3.85 for '*the need for institutional policies supportive towards the partnership activities*' The lowest score obtained for this aspect is 3.12 for '*the need for coordination and transparency on each respective party as well as indicators of existing shared needs.*'



Picture 3. Respondents' Perception of Management Aspect

Findings ranked by criterion can be presented as follows: (1) *The need for institutional policies supportive towards the partnership activities* obtained 96%; (2) *The need for conducive partnership environment* obtained 92%; (3) *The need for proportional involvement of each respective party* obtained 90%; (4) *The need for all resources to be institutionally involved* obtained 88%; (5) *The need for flexible, yet, firm control towards intended goals/objectives* obtained 82%*;* (6) *The need for continuous monitoring and evaluation* obtained 81%*;* (7) *The need for high level trust and commitment on both parties* obtained 81%*;* (8) *The need for sound internal organization on each respective parties* obtained 79%*;* (9) *The need for shared needs* obtained 78%*;* (10) *The need for coordination and transparency on each respective party* obtained 78%.

2. **Discussion**

Based on findings of the study, respondents are in agreement that all indicators of the three aspects in question of the study are support indicators of the implementation of cooperation scope. This is supported by the criterion assigned to each respective aspect. The overall criterion assigned to Capital Resource Aspect is 71.31%, human resource aspect is 78.75%, and management aspect is 84.44%.

Respondents assigning highest criterion to Management Aspect signifies that it is the most determining factor that influence partner's commitmet for establishing cooperation with HEI. Or, in other words, cooperation partners require sound management of partnership.

Respondents assigning low criterion to Capital Resources Aspect signifies that it is not the primary factor that determines success of cooperation partnerships. In other words, cooperation partners are in agreement that, in building a synergetic cooperation, how existing resources can be properly managed is more important than the availability of complete resources.

Respondents assigning low criterion to Human Resources Aspect signifies that cooperation should be more successful when human resources is properly managed.

There are two indicators under Capital Resources Aspects that can be classified as indicators of high level needs. They are (1) *The need for resources to be utilized institutionally* (91%), which only signified partners's expectation that all resources in the cooperation activities are utilized

institutionally and not of personal belongings; and (2) *The need for shared responsibility on risk of damage on resources of each respective party* (89%), which shows cooperation partners's expectation that any potential consequences related to the implementation of cooperation programs should be the responsibility of both parties involved. This point is important considering that all programs has potential failure.

There are three indicators under Human Resources Aspects that can be classified as indicators of high level needs. They are (1) *The need for availability of experts as institutional representatives* (90%), which indicates that cooperation partners requires that all assigned HEI representatives be competent in the area of cooperation programs to be implemented; (2) *The need for professional management staff* (89%), which signifies that cooperation partners requires cooperation management be supported by professional staff; (3) *The need for involvement of experts from both parties* (88%), which indicates that cooperation partners requires that experts from HEIs be involved in any cooperation program. All of the three top indicators under Human Resource Aspects are necessary to ensure succesful implementation of cooperation programs and reduce risk of failure in program implementation.

There are two indicators under Management Aspects that can be classified as indicators of high level needs. They are (1) *The need for institutional policies supportive towards the partnership activities* (96%), which signifies that cooperation partners requires prospective cooperation programs be supported by clear policy of the respective HEI to ensure its continuity; (2) *The need for conducive partnership environment* (92%), which indicates that cooperation partners expect that conducive conditions established to ensure successful implementation of cooperation programs and prevent emergence of hinders in communication that are potentials of non conducive conditions.

There are several compentence indicators that can be classified as indicators of low level needs. They are

(1) *The need for SOP on utilization of resources of both parties* (43%), which signifies cooperation partners' tendency to manage their own resources ―including financial resources― without other party's involvement; (2) *The need for standards of adequate research facilities on both parties* (51%), which indicates cooperation partners tendency to consider standards of HEI research facilities a non prerequisite to cooperation program, but optimizing utilization of existing research facilities of HEI for cooperation purposes; (3) *The need for a profile of resources utilized for partnership activities* (58%), which signifies that cooperation partners tend to perceive complete profile of HEI is not a prerequisite in considering cooperation with HEIs; (4) *The need for involvement of HR with relevant national and international experience*' (55%), which indicates that naitonal and/or international experience is not a determinant of successful establishment of synergetic cooperation program.

CONCLUSION

The above analysis and discussion of findings lead to the following conclusion:

1. To identify the role of cooperation partners and reveal dominant indicators that determine success in implementing the scope of synergetic cooperation in preparing VCE teachers, three major aspects are required. They are Capital Resources Aspect, Human Resources Aspect and Management Aspect.
2. For Capital Resources Aspect, determinant indicators include the need for shared responsibility on risk of damage on resources of each respective party, the need for capital specially prepared for partnership, the need for physical facilities to be properly managed for partnership activities purposes, the need for standards of adequate research facilities on both parties, the need for resources to be utilized institutionally, the need for management of resources utilized by both parties, the need for accurate information and data base, the need for an inventory of resources utilized by both parties, and the need for a profile of resources utilized for partnership activities.
3. For Human Resources Aspect, determinant indicators include the need for a map of HR involved in the partnership program, the need for professional management staff, the need for reward and punishment mechanism for people involved in the partnership, the need for involvement of all staff on both parties with regards to their respective capacity, the need for proportional involvement of HR from both parties, the need for involvement of experts from both parties, the need for strong and highly responsible leadership, the need for the partnership to be free from personal interests and/or dominance or double-standard practices, and the need for availability of experts as institutional representatives.
4. For Management Aspect, determinant indicators include the need for institutional policies supportive towards the partnership activities, the need for conducive partnership environment, the need for proportional involvement of each respective party, the need for all resources to be institutionally involved, the need for flexible, yet, firm control towards intended goals/objectives, the need for continuous monitoring and evaluation, the need for high level of trust and commitment on both parties, and the need for sound internal organization on each respective parties.

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KNOWLEDGE IDENTIFICATION IN STAIN BUKITTINGGI

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Abstract

Nowadays, Knowledge Management in educational organization such university needs to be applied. One thing could be held by organization is knowledge identification, where and how to identify the knowledge that useful for organization development. STAIN Bukittinggi as one of the public educational institution should also begin and develop this process in several ways based on organization condition itself. It's such by implementing some knowledge identification strategies that will be useful for organization to get a knowledge in achieving their vision and mission.

***Keywords** : knowledge identification, STAIN Bukittinggi*

1 Introduction

The development of science and technology so rapidly and the global nature of the impact on the demands, challenges and needs of such a complex at the end of the 20th century requires colleges to make rapid changes and development continously and sustainably. Change and development referred to as the growth in all fields both quantitatively and qualitatively (physically and culturally) that coincided with changing attitudes, values, perceptions, and motivation high all members of the academic community.

State Islamic College (STAIN) Bukittinggi as high institutions in Islamic religious knowledge determined to be a college that can meet the challenges and demands of the future. Therefore, knowledge management needed toward development and change in the direction of progress and modernization. Therefore we need a dynamic attitude, innovative, and response to any demands for changes from all members of the academic community.

Also to be able to play a role in the future as an Islamic religious institution of higher education, strong-willed STAIN Bukittinggi to achieve the ideals of magnitude, namely the Islamic colleges with various advantages. In other words will be a center of excellence and centers of Islamic civiliation. This all can be done if there is determination and spirit of the surge in the use of knowledge management toward change, growth, and reform in all areas of a planned, systematic, and continuous.

In order for that goal realized, change and development must be based on the implementation of knowledge management. Associated with the core processes of knowledge management namely knowledge goals, knowledge identification, knowledge acquisition, knowledge development, knowledge sharing / distribution, knowledge utilization, knowledge recitation and knowledge

assessment. Especially that I discuss in this paper is the application of knowledge identification. Related to the phenomenon that occurs at STAIN Bukittinggi, how knowledge organizations in identification, either from within the organization and outside the organization and what the benefits of identifying good knowledge of internal and external organizations.

2 Discussion

2.1 Phenomena Identification Knowledge in Bukittinggi STAIN

Identify knowledge implies that the organization must be able to analyze and describe the knowledge in the organization from both internal and external organizations. Identify internal knowledge means that the organization must be able to a portrait and a known the knowledge from within his organization. From an external means to analyze and describe the knowledge outside the organization that relate to environmental organizations. A large number of organizations are difficult to maintain an overview of internal and external data, information and skills.

This phenomenon is caused by the lack of transparency of all members of the organization so that it can lead to inefficiency, lack of information and duplication. Knowledge management will be effective if it can ensure internal and external transparency sufficient, and help all individuals in the organization to find what they need.

The reality in Bukittinggi STAIN this activity is still difficult to do, it is caused because each member organization has not yet share the same vision for the advancement of this institution. Each member is more concerned with ego and the ability of each. So do not create a good personal mastery on each individual. So the blame in running the organization.

2.2 Knowledge Identification

In this process the organization can identify the internal knowledge and external / environmental organization. As for identification needs to be done is as follows:

2.2.1 Student

Who STAIN Bukittinggi students to be served, their background, how the level of economic welfare, how big their motivation to learn, and how mature them to learn? All these should be identified to determine how to best service them. This identification is also necessary to determine how much the tuition and other fees that can be drawn from them.

2.2.2 Government

Government as the owner or the university supervisor must be known exactly their tendency, as contained in Act No. 20 of 2003 on the System of National Education, which will be followed by Government Regulation on National Education Standards. The government also already have the framework for higher education accreditation, it's just how far the National Accreditation Board (BAN) will use these criteria to accredit STAIN Bukittinggi until now has not known exactly, because almost the entire course of study already submitted its accreditation. Until now still in the stage of the process except the PAI study programs that have been accredited B.

For STAIN Bukittinggi is also important to note is the extent to which government trust to STAIN Bukittinggi, and the extent to which the balance in determining subsidies. Until now the unit cost (per student) subsidy given to STAIN Bukittinggi is still relatively low when compared with subsidy unit costs for university students in the country under the auspices of Education Institution.

2.2.3 Candidate container Employer (Employer) of graduates

It's not a day longer college determines its curriculum without intensive consultation with the industry or the users and stakeholders which will accommodate the graduates to work. Without this intensive consultation so many college graduates that can not be absorbed into the jobs because it does not meet the requirements. Terms of the working world even this is changing rapidly, so that colleges are often left behind in adapting the curriculum to change this requirement.

Problems of the graduates who are ready or not ready-made, which some time ago become a popular topic of discussion, triggered by the pace of curriculum. In countries that have advanced the industry there was still the question of whether the college curriculum is still relevant to the skills that prompted the industry a few years later. This problem should be very careful when STAIN Bukittinggi graduates are expected to have the quality skills and knowledge required by industry or users.

2.2.4 Community

Because public universities receive government subsidies and subsidies from the community through taxes, then the community at large also become stakeholders from universities, including STAIN Bukittinggi. Now some people have started to be critical to the college, it will cause emergence of good perception among the public at large. This perception is then translated into a desire to enroll their children, or himself, in the universities.

Open information will also cause people to know more about STAIN Bukittinggi, either through conventional publications or websites, so the STAIN Bukittinggi known to the wider community.

2.2.5 Main Performance Indicators

Basic indicator is meant here is the primary means to measure the extent to which STAIN Bukittinggi has shown good performance. Measurements here are not necessarily exact, eg: 'satisfaction', but are relatively easily obtained and understood people. There are a number of other technical indicators are usually used professionals to demonstrate the performance of a university. Technical indicators will be discussed in a discussion of the components and indicators of the quality assurance system frame of reference following STAIN Bukittinggi.

2.2.6 Stakeholders Ssatisfaction

Stakeholder satisfaction, although seen as 'subjective' has a very large sense for the perception of stakeholders towards STAIN Bukittinggi. When students are satisfied, it can mean that good service and quality of education, or by other causes, depending on the results of a survey conducted by STAIN Bukittinggi.

2.2.7 Productivity

College productivity is usually measured by comparing output with input, if the number of graduates divided by the number of students at entry time high, said high productivity. Which means lots of students who graduated within the specified time (for S1: 4 years, D3: 3 years).

2.2.8 Efficiency

Levels dropped out students and study leave can be a measure of efficiency for STAIN Bukittinggi, in the sense that the lower number of students who drop out and leave study in the various courses that are developed in STAIN Bukittinggi, means the higher the level of efficiency.

2.3 Benefits Identification Knowledge

The usefulness of identification of knowledge at the College of Islamic Religious Affairs M. Sjech Djamil Djambek Bukittinggi include:

2.3.1 Internally

a. Well-manage continuous quality improvement program
   This is related to quality improvement and development of academic staff, so that will happen Improved learning function at the College of Islamic Religious Affairs (STAIN). Furthermore, management improvement State Islamic College (STAIN) and coaching program tertatanya academic atmosphere.

b. Well actualization programs organizational principle of autonomy
   This is associated with an increased pattern of development of academic staff management mechanism, improving the function of normative body at the College of Islamic Religious Affairs (STAIN) and increasing the role of the State Islamic Institute (STAIN) in the planning and development.

c. Increasing organizational accountability
   Well-organized program that includes an integrated resource development at the College of Islamic Religious Affairs (STAIN) and increasing the autonomy of science actualization.

d. Readiness in the accreditation
   Which include increased readiness in the face of accreditation, preparedness in conducting follow-up of the accreditation process and improving the quality and relevance of research results, improving the quality and relevance of service to the community and improving the quality of student development.

2.3.2 The External

Usefulness of the external environment can be described as follows: first to increase educational resources to be able to supply the resources needed in the wider community. Second, State Islamic High School (STAIN) grew as a center for educational growth in a wide area. Third, State Islamic College (STAIN) as institutions that produce science and technology will increasingly play a driving force in advancing public life. The four high school graduates the desire to enter the College of Islamic Religious Affairs (STAIN). Fifth increase the growth of scientific products (Religion,

Science and Technology). The sixth social welfare increases. And the last State Islamic College (STAIN) became the center of inter-disciplinary consulting services religious sciences.

3 Conclusion

From the description mentioned earlier, it can be authors conclude that STAIN Bukittinggi as educational organizations will be able to apply knowledge management with particular regard to identification of knowledge in acquiring the knowledge to achieve the vision and mission of the organization.

General phenomenon that occurs in organizations of STAIN Bukittinggi is a lack of understanding about the mission and vision, personal mastery, team learning, personal mental and system thinking are still not in line with expectations of this organization. Furthermore, to make STAIN Bukittinggi knowledgeable organization it is necessary that the strategy should be implemented and eventually will be able to be useful for the progress and development STAIN Bukittinggi on the present and future.

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THE ANALYSIS OF TOTAL PERFORMANCE SCORECARD APPROACH ON THE DEVELOPMENT OF FASHION DESIGN STUDY PROGRAM JAKARTA STATE UNIVERSITY

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Abstract

In Present, the development of education concerns to increase quality and relevance of national development need. University as providers of education services received students as an input through the educational process and expected to provide the output of quality graduates. In that case, university should have an effective strategy through competition including quality of education.

Total Performance Scorecard (TPS) aims to integrated personal and organizational in continuous improvement, development, and learning. The first step is formulated Personal Balanced Scorecard (PBSC) and Organizational Balanced Scorecard (OBSC) to improved personal and organizational performance that including mission, vision, critical success factor, objectives, performance measures, targets, and improvement actions. These points are to align the personal ambition of the employee with the organization ambition and to get a strategic plan of Fashion Design Study Program, Jakarta State University.

The alignment of personal ambition of the employee with the organization ambition is done by translated the scorecard department, scorecard of each major, and individual performance plan. Using TPS in organizational will increase personal and organizational performance that integrated and continuous. With improving, developing, and learning cycle continuously will improving personal and organizational performance.

Keyword : Performance Measurement, Balanced Scorecard, Total Performance Scorecard

1 Introduction

When we look at the rapid growth of the education world today, there has been a paradigm shift in educational development which was originally focused on equal educational opportunities to focus on efforts to improve the quality and relevance to national development needs. University as providers of education services received students as an input through the educational process and

expected to provide the output of quality graduates. In addition, the expected outputs are useful research and efficient community service programs.

In answering the target output level of success, all activities must be measured through performance assessment, whether the level of successful implementation of strategies can achieve the organizational goals. In the level of achievement, through this performance assessment will be known that there are obstacles to be followed up by making improvements and changes.

Fashion Design Study Program is one of the majors which are parts of Home Economics Sciences Faculty of Engineering, Jakarta State University. Fashion Design Study Program is making improvements in all areas. But all efforts of this change has not been fully implemented well, it is necessary to change strategy even better by aligning organizational goals with the ambition of its employees in improving the welfare and convenience in working.

2 Methodology

The methodology will be conducted by the researcher in collecting data consists of several stages: (1) the formulation of Personal Balanced Scorecard; (2) the formulation of Organizational Balanced Scorecard; (3) To communicate and to connect the Organizational Balanced Scorecard with the scorecard of study program and individual performance plan; (4) Analyze of the implementation of Total Performance Scorecard in strategic planning to develop Fashion Design Study Program Jakarta State University.

Total Performance Scorecard includes incorporation and development of the concept of Balanced Scorecard, Total Quality Management and Competence Management. Total Performance Scorecard is defined as a systematic process, improvement, development, and learning that is continuous, gradual, and routine, which focused on personal and organizational performance improvement on an ongoing basis. Total Performance Scorecard covers the entire unit's mission and vision of the organization, key roles, core values, critical success factors, objectives, performance benchmarks, targets, and remedial actions, and also the results of improvement, development and continuous learning.

Model Total Performance Scorecard is an integrated cyclic model in which there is interaction between the three powers of improvement, development and learning as its core. The model consists of five stages: (1) Formulation. At this stage consists of the formulation stage of the Personal Balanced Scorecard (PBSC) and the Organizational Balanced Scorecard (Organizational Balanced Scorecard). PBSC focuses on individual improvement of each employee and aims to improve the welfare and success. While the Organizational Balanced Scorecard focuses on continuously improving business process; (2) Communicating and connecting. In this stage all parties concerned take part in new business strategies to effectively communicate and translate the corporate scorecard to all business units and team scorecards, then linking the team scorecard with performance plan for each employee (3) Repair. This phase focuses on implementation of corrective actions individuals and organizations. Deming Cycle is used in both of these improvements to improve business processes and make improvements based on the Organizational Balanced Scorecard performance of each employee based on the PBSC. (4) Development. This process involves continuous development of skills relating to the work of individual employees based on the

cycles of development (5) Review and learning. Process includes the collection of feedback information, review the scorecard, the actualization of the scorecard based on changing conditions, documentation of lessons learned, and identify improvement opportunities and follow-up.

3 Data Collections and Processing

3.1 Formulation of Personal Balanced Scorecard

Rampersad's said that the formulation of Personal Balanced Scorecard is a process that is voluntary (voluntary process) of the respondents. Thus, the respondents who were resistant to the concept of Total Performance Scorecard and Personal Balanced Scorecard should not be imposed so that they would formulate their Personal Balanced Scorecard and involved with the formulation of ambition with the team and organization. Table 3.1 shows examples of the formulation of the Personal Balanced Scorecard from the Lecturer of Fashion Design Study Program is Mrs. X.

Table 3.1 *Personal Balanced Scorecard*

Mrs. X, Lecturer of Fashion Design Study Program

Personal vision	To develop the skills / knowledge professionals in the field of my expertise through the learning process which performed continuously
Personal Mission	1. Function as partners for internal and external customers 2. Continually develop professional competence 3. Enjoy the work activity and take the initiative and keep learning 4. Enjoying physical health, emotional and mental 5. Maintaining financial stability
Key role:	
as a wife	My husband is the most important person in my life
as a mother	I want to accompany my child and be there anytime they need
as a lecturer	Continue to develop professional skills in the field of fashion and technology
as the incumbent	Honest, responsible / commit in work, discipline, can work with partners (colleagues, clients, community)

Table 3.2 Critical Success Factors, Objectives, Personal Performance Measurement, and Personal Corrective Action from Mrs. X, Fashion Design Study Program Lecturer

Financial Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
Financial Health	Increased Revenue	Increased revenue	At least 10% per year	Work harder and are always looking for opportunities to increase revenue lawfully
Financial management	Planning programmed	Mapped all needs	2,5% zakat/month	Optimally allocated
			5% savings per month	
			5% insurance / month	
			87.5% requirement	
External Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
Appreciated and loved by friends, colleagues, leaders and students	Having a good relationship with student	Ease met on campus for the final guidance and non-academic	Min. 1x a week, on a schedule agreed upon with the student	Establish a schedule for student guidance 2x a week

	Having a good relationship with co-workers	Established good communication and cooperation	Min 1x a week there are regular meetings to discuss	Maintaining good relations, mutual respect and appreciate
	Having a good relationship with the leadership	Established communication, cooperation and responsibility	Min 1x a month there is a meeting leader	Create performance reports and maintain good relations
Produce quality work	Creating teaching materials	The number of teaching materials	Min 1 teaching materials per year	Creating teaching materials in the areas of expertise / knowledge
	Writing scientific papers	The number of research	Min 1 research per year	Doing research in the field of expertise
	Doing community service	The amount of P2M	Min 1 activity per year	Conducting P2M
Working together with harmony, mutual help, inspire others and share knowledge	Creating a grant proposal competition with colleage	Competitive grant proposals	Arranged a grant proposal competition	Creating a grant proposal competition with colleage
Internal Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
Try to achieve physical health, mental and	Physical Health	Percentage days absent due to illness	Lifelong healthy	Maintain the condition of the body by exercising, taking

spiritual				vitamins and healthy food
	Mental Health	Stress intensity	No stress	Improving emotional balance
	Spiritual Health	Improving the quality of faith and piety	Go to Hajj	Enhance spiritual appreciation
Growth and Learning Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
I learn something new every day	Increased knowledge in fashion	Number of books read fashion	At least one book in one month	Being an active member of the library
	Increased knowledge in education and teaching	The number of educational books to read	One book in one month	Being an active member of the library and buy books

3.2 Formulation of the Organizational Balanced Scorecard

Vision Fashion Design Study Program is "Being a producer of human resource education institutions that can anticipate the challenges and opportunities in the era of globalization through the implementation of service improvement in education and teaching, research and community service". Mission Fashion Design Study Program are implement Tri Dharma University, produce competent human resources, professional, and high moral and scientific excited and have the ability to compete, produce thinkers and developers of science and technology in a creative, adaptive, imaginative and productive partnership with industry and the business world so that obtained the development of new technologies, industry experience for lecturers and students, supporting the business community in Indonesia.

Table 3.2 Critical Success Factors, Objectives, Personal Performance Measurement, and Personal Corrective Action from Mrs. X, Fashion Design Study Program Lecturer

Fashion Design Study Program

Financial Perspective				
Critical Success Factors	**Critical Success Factors**	**Critical Success Factors**	**Critical Success Factors**	**Critical Success Factors**
Financial Health	Increased Revenue	Increased Revenue	At least 10% per year	Increasing the capacities of students, and make proposals grant competition
The quality of planning and budgeting	Improve financial management systems	The implementation of planning and budgeting conformity with the realization of activities	100% realized	Mapping of budget in accordance with the activity (making the Draft Budget)
Quality accountability report	Improving the quality of accountability reports	The existence of an accountable financial statements	100% realized	Creating a quality and accountability report
External Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
Improved image and public service	Increasing the image of the study program	Implementation of promotion through web services, print media and electronic media and a variety of activities	Holding image improvement programs and public service 1x per semester (open houses, seminars, etc.)	Facilitate and schedule a program to improve the image and public service

Increased cooperation	Cooperating with vocational, industrial, government of Jakarta / other institutions and alumni	Implementation of cooperation activities	The existence of the signing of cooperation for education and teaching, research and P2M at least in 2008 there were 5 of cooperation in the form of SPK	Cooperate with vocational, industrial, government of Jakarta / other institutions and alumni
Internal Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
Improving the quality and professionalism of lecturers	The increasing professionalism of lecturers through further studies	An increasing number of professors who educated S2 and S3	Lecturer 80% S3	Requiring and send lecturers for doctor program
	Increased knowledge and skills of faculty through courses, training, internships and seminars	Increasing the number of lecturers who have a skill certification standard field of study	50% of the faculty in 2010, have certified expertise / pass the competency test	Send a lecturer for the course, training, internships, and seminars
The quality and quantity of research and P2M	Increasing the quality and quantity of research and P2M	Number of research published in the local, national and international	5 research persemester	Giving motivation for lecturers to conduct research
Increased professionalism of staff and laboratory	Increased knowledge and skills of administrative	Increasing the number of administrative staff and	80% administration and laboratory staff are	Sending administrative staff and laboratory staff to attend courses,

administration	staff and laboratory staff through courses, workshops, etc.	laboratory staff who have certified expertise	certified / graduated in the competency test	training and workshops
Improvement and development facilities and infrastructure	Increasing the quality and quantity of laboratory facilities and supporting lectures	Improved facilities and infrastructure	The number of additional laboratory equipment and quality tools	Procurement of facilities and infrastructure
	The increase in library books and facilities	Improved library facilities	The number of additional books and library facilities	Procurement of books and library facilities
	Increased means of building and building	Improved means of building and building	The implementation of procurement and repair of buildings and building facilities	Procurement and repair of buildings and building facilities
Improving the quality of academic services and academic administration	Improve customer satisfaction with academic services and academic administration	Implementation of academic administrative services	Document academic regulations and academic database	Implement service excellence
		Implementation of academic and non academic guidance	Increasing the role of PA (min 2x guidance in one semester)	Organizing academic and non academic guidance

Growth and Learning Perspective				
Critical Success Factors	**Objectives**	**Personal Performance Measurement**	**Private Target**	**Personal Corrective Action**
Improving the quality of learning	Increasing lecturer competence	Implementation of various models of learning	Effective and enjoyable learning process	Sending lecturers to learn new development learning model
		Realization of learning evaluation model	There is a valid evaluation	Sending lecturers to learn new evaluation model
		Number of innovative media	Available innovative media	Send lecturers to learn new innovative media production
Improved information and communication technology as a means of learning	Develop enrichment learning materials by using IT	Implementation of e-learning in the learning process	availability e-learning facility	Setting up e-learning facilities
				Training making material e-learning
Improving the quality of curriculum	Increasing the quality of the curriculum in accordance with the development of science and technology and the needs of the working world	Meeting the minimum curriculum content standards and competency standards	Formed an evaluation team and curriculum developers	Formation of evaluation teams and curriculum developers
			Specification documents and curriculum structure	Workshop on curriculum development and manufacture of SAP and teaching

				materials
Optimizing the scientific field	Improve the function of scientific discipline	Implementation of mapping and the empowerment of lecturer competence based on knowledge areas	Formed KBI (Group of the Scientific Field)	Form a group of science

4 Application of TPS at Fashion Design Study Program

4.1 Communicating and Linking the Balanced Scorecard

To translate the organization's strategic vision into action, Fashion Design Study Program scorecard should be linked to the Balanced Scorecard on an individual performance plan. Each individual prepare their scorecard and adjusted to Fashion Design Study Program. Here is the scorecard translation of Fashion Design Study Program and the individual performance plan.

Table 4.1 Scorecard Fashion Design Study Program, and Performance Plan of Mrs. X in the Financial Perspective

	Organization Unit	**Objectives**	**Performance Measurement**	**Target**
FINANCIAL	Fashion Design Study Program Scorecard	Increased Revenue	Increased Revenue	At least 10% per year
	Lecturer Performance Plan (Mrs. X)	Optimally allocated	More optimal use of funds	Always stable
		Contribute actively in making the grant proposal competition	Number of proposals	1x per year

Relations between Fashion Design Study Program scorecard and individual performance plans can be seen in figure 4.1 below.

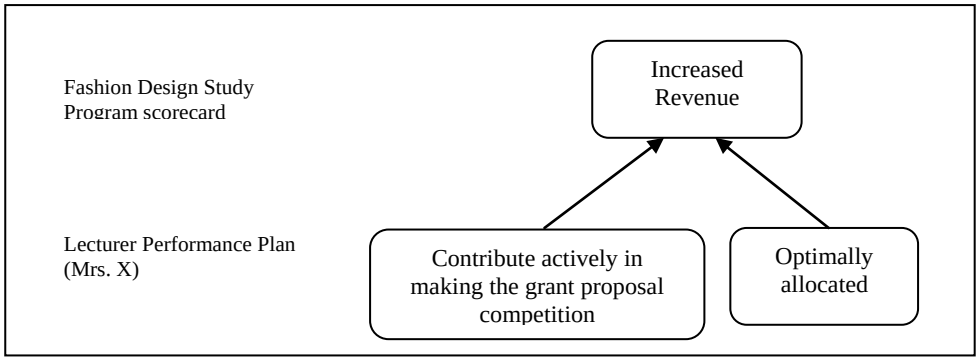


Figure 4.1 Relationship Between Fashion Design Study Program scorecard and Performance Plan of Mrs. X in the Financial Perspective

Table 4.2 shows the translation Fashion Design Study Program scorecard and the individual performance plan Mrs. X in an external perspective.

Table 4.2 Scorecard Fashion Design Study Program, and Performance Plan of Mrs. X in the External Perspective

	Organization Unit	**Objectives**	**Performance Measurement**	**Target**
EXTERNAL	Fashion Design Study Program Scorecard	Increasing the image of the study program	Implementation of promotion through web services, print media and electronic media and a variety of activities	1 x per year
	Lecturer Performance Plan (Mrs. X)	More professionals to evaluate any work that has been done	Creative and innovative in working	Improved morale
		Make a plan of activities	Established good communication and cooperation	Min. 1x a week there are regular meetings to discuss

Relations between Fashion Design Study Program scorecard and individual performance plans can be seen in figure 4.2 below.

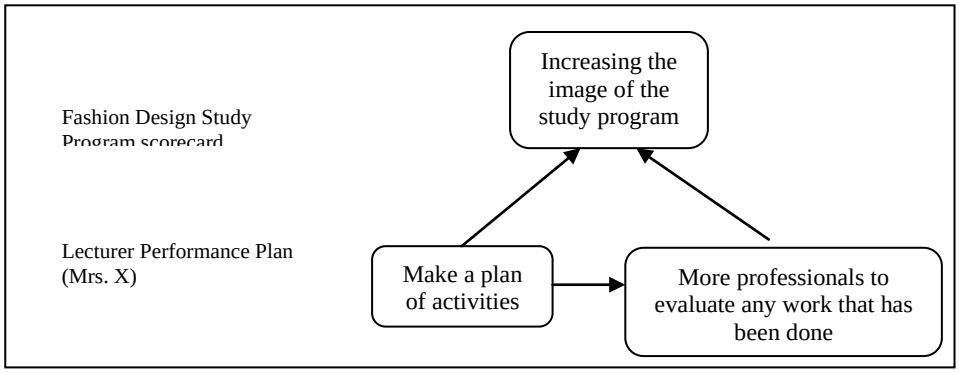


Figure 4.2 Relationship Between Fashion Design Study Program scorecard and Performance Plan of Mrs. X in the External Perspective

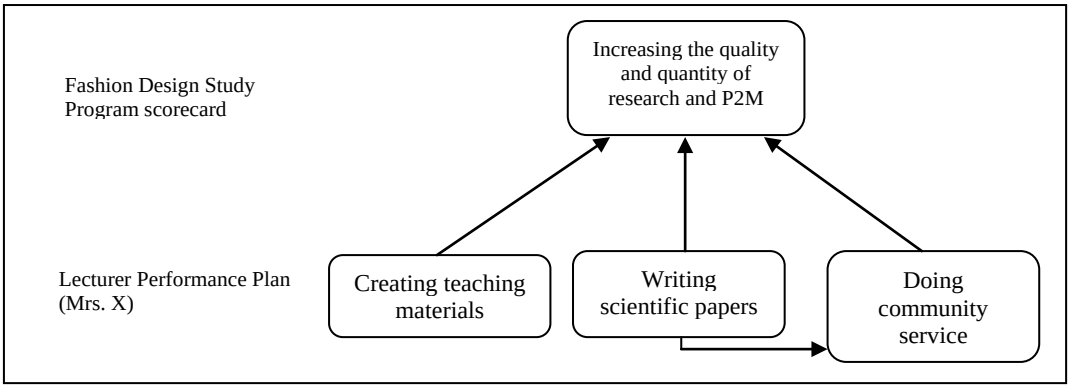
Table 4.3 shows the translation Fashion Design Study Program scorecard and the individual performance plan Mrs. X in an internal perspective.

Table 4.3 Scorecard Fashion Design Study Program, and Performance Plan of Mrs. X in the Internal Perspective

	Organization Unit	**Objectives**	**Performance Measurement**	**Target**
INTERNAL	Fashion Design Study Program Scorecard	Increasing the quality and quantity of research and P2M	The number of published studies at local, national and international	5 researches per semester
			The number of well-funded P2M in the level of faculty, university and DIKTI	5 P2M per semester
	Lecturer Performance Plan (Mrs. X)	Creating teaching materials	The number of teaching materials	Min. 1 teaching material per year
		Writing scientific papers / researches	The number of researches	Min. 1 research per year

		Doing community service	The number of P2M	Min. 1 activity per year

Relations between Fashion Design Study Program scorecard and individual performance plans can be seen in figure 4.3 below.



and Performance Plan of Mrs. X in the Internal Perspective

Table 4.4 shows the translation Fashion Design Study Program scorecard and the individual performance plan Mrs. X in an growth and learning perspective.

Table 4.4 Scorecard Fashion Design Study Program, and Performance Plan of Mrs. X in the Growth and Learning Perspective

	Organization Unit	**Objectives**	**Performance Measurement**	**Target**
GROWTH AND LEARNING PERSPECTIVE	Fashion Design Study Program Scorecard	Increasing lecturer competence	Implementation of various models of learning	Effective and enjoyable learning process
			Realization of learning evaluation model	There is a valid evaluation
			Number of innovative media	Available innovative media
	Lecturer Performance Plan	Increased knowledge in fashion	Number of fashion books	At least 1 book in 1 month

	(Mrs. X)	Increased knowledge in education and teaching	Number of education books	1 book in 1 month

Relations between Fashion Design Study Program scorecard and individual performance plans can be seen in figure 4.4 below.

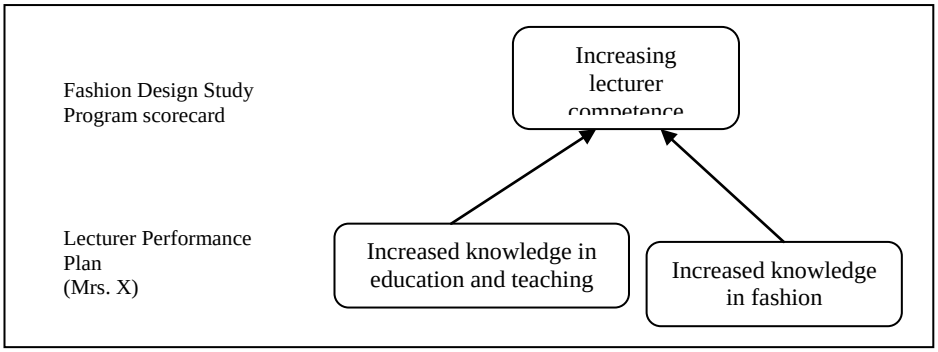


Figure 4.4 Relationship Between Fashion Design Study Program scorecard and Performance Plan of Mrs. X in the Growth and Learning Perspective

5 Analysis

Based on a translation of Fashion Design Study Program scorecard and individual performance plan in table 4.1 to figure 4.4, can be seen that the translation study program to individual performance plans are mutually supportive relationship with one another. If employees have a strong commitment to implement what they have planned in the individual performance plan and PBSC they have formulated along with the motivation of the majors, it can create a relationship between individual performance plans, objectives and major program of study that is more harmonious and mutually supportive so as to obtain more optimal results and achieve the ultimate goal of majors. In this research activity is limited to the cycle of polling stations to communicate and connect PBSC and Organizational Balanced Scorecard. From the results obtained from the relationship between the organization and individual performance plan obtained agreement outcomes and competence-oriented job.

6 Conclusion

Based on research that has been done, it can be concluded as follows: (1) Design a strategy for the Fashion Design Study Program by Total Performance Scorecard approach has been made but the extent to which the successful application of this method cannot be delivered because the implementation process is still continuing up to evaluation time limits to be determined by the department (2) To increase the employee's performance is by creating working conditions on employees to be ready to make changes, so has the willingness to look for strategic thinking and new ideas, and ready to make ourselves more professional in every respect (3) Based on the formulation

of Personal and Organizational Balanced Scorecard Balanced Scorecard, there are no significant obstacles if the Fashion Design Study Program want to apply the Total Performance Scorecard in their organization in order to improve performance with high integrity.

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THE ANALYZE STUDY METHOD (SUGGESTION) EFFECT OF STUDY RESULT IN FASHION DRAW

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Abstract

This research aim to know the influence of study method result learns to draw the cloth. Study method consisted of two kinds of, that is: (1) Method I (discussion combination, demonstrate, and taskforce), and (2) Method II (discussion combination, demonstrate, taskforce and sugestopedia)

This research is in study program of textile and fashion design majors of Home economics Technique Faculty State University of Jakarta at semester 2 academic year 2009 / 20010. Research method used by method of quasi experiment design. This Research population is study program of textile and fashion design student which is taking of drawing cloth. Sample taken in saturated sampling, which is technique of determination sample when all population members used as sample.

Analyze use the of U Mann Whitney test. Obtained by result of examination for the T1 of (treatment 1) and K1 (control 1) obtained by U1 = 33, 63 for the N of = 26, U2 = 13, 70 for the N of = 22 with the amount rank of at sample 1 (R1) = 874, 5, amount rank of sample 2 (R2) = 301, 5, with the level significant = 0,000. From examination result for the T2 of (treatment 2) and K2 (control 2) obtained by U1 = 36, 05 for the N of = 22, U2 = 14, 73 for the N of = 26 with the amount rank of sample 1 (R1) = 793 and sum up the rank of sample 2 (R2) = 383.

Because p value = 0.000 far below standard value (0, 05) matter express that result learn with the method II (combination by sugestopedia) compared to by method I (combination without sugestopedia). Result of this research can give the information that there is influence of study method by sugestopedia to result learn to draw the cloth of student of study program textile and fashion design

Keyword*: Sugestopedia, experiment.*

Latar Belakang Masalah

Pendidikan di Indonesia diharapkan mampu merealisasikan tujuan pendidikan nasional, seperti yang tertulis dalam Undang-Undang Sistem Pendidikan Nasional No. 20 tahun 2003 yang menyatakan bahwa pendidikan nasional berfungsi mengembangkan kemampuan dan membentuk watak serta peradaban bangsa dan martabat dalam rangka mencerdaskan kehidupan bangsa, bertujuan untuk berkembangnya potensi peserta didik agar menjadi manusia yang beriman dan

bertakwa kepada Tuhan Yang Maha Esa, berakhlak mulia, sehat, berilmu, cakap, kreatif, mandiri, dan menjadi warga negara yang demokratis serta bertanggung jawab.[30]

Pada proses pelaksanaan pendidikan di universitas, dosen memegang peranan yang menentukan, karena bagaimanapun keadaan anak didik, maka pada akhirnya tergantung pada dosen dalam memanfaatkan kemampuan yang ada. Dalam hal ini dosen mempunyai peranan dalam membimbing mahasiswa agar mencapai tujuan yang diharapkan, dimana semuanya sangat menentukan terhadap adanya perubahan tingkah laku mahasiswa sebagai hasil belajar.

Banyak alternatif metode pembelajaran yang dapat dipilih dan digunakan oleh dosen, namun pada prinsipnya tidak ada satu pun metode mengajar yang dapat dipandang sempurna dan cocok dengan semua pokok bahasan yang ada dalam setiap bidang studi yang diajarkan. Setiap metode mempunyai sifat masing-masing, baik mengenai kebaikan-kebaikannya maupun menetapkan mengenai kelemahan-kelemahannya.[31]

Untuk itu ada beberapa hal yang perlu diperhatikan dalam pemilihan metode pembelajaran yaitu disesuaikan dengan tujuan pembelajaran, materi pelajaran, jumlah mahasiswa, kemampuan mahasiswa untuk menerima materi pelajaran, kemampuan dosen dalam menggunakan berbagai jenis metode pembelajaran, fasilitas yang ada dan waktu yang disediakan untuk penyajian. Dalam hal pemilihan metode pembelajaran ini, dosen dapat melihat berdasarkan kelebihan dan kelemahan metode yang akan digunakan. Dengan demikian kemampuan mahasiswa tercapai secara optimal.

Pada pembahasan di atas ada beberapa macam metode mengajar secara global, yaitu : (1) metode proyek atau unit, (2) metode eksperimen (percobaan), (3) metode tugas dan resistasi, (4) metode diskusi, (5) metode sosiodrama, (6) metode demonstrasi, (7) metode problem solving (metode pemecahan masalah). (8) metode karyawisata, (9) metode tanya jawab, (10) metode latihan (metode training), (11) metode ceramah, dan (12) metode sugestopedia.[32]

Pemilihan metode pembelajaran untuk mata pelajaran menggambar busana yang tepat akan membantu mahasiswa dalam upaya memahami pelajaran tersebut dan mendapatkan motivasi dalam belajar, yang diharapkan dapat meningkatkan hasil belajar mahasiswa terhadap pelajaran menggambar busana.

Kajian Teori

Kegiatan belajar dan mengajar adalah sebuah interaksi yang bernilai pendidikan. Di dalamnya terjadi interaksi edukatif antara dosen dan mahasiswa pada saat dosen menyampaikan materi pelajaran kepada mahasiswa di kelas. Materi pelajaran yang dosen berikan itu sebaiknya dapat mendorong mahasiswa mempunyai minat dan motivasi dalam belajar. Jika dosen dalam menyampaikan materi pelajarannya kurang memberikan dorongan kepada mahasiswa, bisa jadi hal ini disebabkan penggunaan metode pembelajaran yang tidak sesuai dengan materi pelajaran. Untuk itu, peranan metode pembelajaran menempati posisi penting dalam penyampaian materi pelajaran.

Setelah mahasiswa mengikuti kegiatan proses belajar mengajar, maka diharapkan pada dirinya terjadi suatu perubahan tingkah laku sebagai hasil dari proses belajar mengajar tersebut. Perubahan yang terjadi dalam hal ini adalah perubahan dalam pengertian yang baik yaitu dalam

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[30] Undang-undang Republik Indonesia Nomor 20 tahun 2003 tentang Sistem Pendidikan Nasional, (BP. Cipta Jaya : Jakarta, 2003), h. 7

[31] Syaiful Bahri dan Aswan Zain, Op.cit, hal, 78

[32] Ibid, h. 83-97

bentuk pengetahuan, sikap, maupun keterampilan fisik yang diperoleh, yang merupakan penambahan atau peningkatan suatu perilaku. Dari yang tidak tahu menjadi tahu, dari yang tidak mengerti menjadi mengerti atau dari yang sudah mengerti menjadi jelas.

Kondisi objektif menunjukkan bahwa aktifitas belajar mahasiswa kadang-kadang memperlihatkan gejala yang tidak diharapkan, misalnya kurang adanya perhatian mahasiswa terhadap materi pelajaran yang sedang disampaikan. Gejala seperti ini jika dibiarkan tanpa segera diantisipasi maka akibatnya akan berdampak negatif terhadap hasil belajar mahasiswa.

Permasalahan di atas tentu membawa konsekuensi bahwa dosen dituntut kemampuannya agar dapat membangkitkan perhatian mahasiswa terhadap materi pelajaran yang sedang berlangsung. Terutama ketika mahasiswa sedang menyelesaikan gambar. Adapun salah satu cara yang digunakan oleh dosen terhadap proses belajar mengajar agar mahasiswa timbul perhatiannya dalam menyelesaikan tugas menggambar busana, dengan menyajikan contoh-contoh gambar yang sudah jadi, sehingga mahasiswa mempunyai gambaran tentang hasil akhir dari gambar yang sedang dikerjakan, dan mempunyai daya tarik mahasiswa. Dengan memberikan gambaran atau contoh-contoh gambar tersebut dapat mempermudah mahasiswa memahami maksud dari gambaran anatomi tubuh manusia tersebut.

Salah satu keberhasilan proses belajar mengajar di lihat dari hasil belajar yang dicapai oleh mahasiswa. Hasil itu tampak pada perubahan tingkah laku mahasiswa dan lebih khusus pada penguasaan materi pelajaran. Keberhasilan mahasiswa dalam belajar dipengaruhi oleh faktor dosen dan cara mengajarnya. Melalui cara mengajar itu, dosen harus dapat menciptakan kondisi kondusif untuk belajar. Dosen harus menciptakan kondisi agar hanya tingkah laku yang diinginkan saja yang diberi penguatan. Agar mahasiswa berkonsentrasi dan dapat menyelesikan tugas menggambar dengan baik, dalam menggambar bisa diselingi dengan alunan musik pop instrumental yang dapat menenangkan pikiran dan mengasah kreatifitas mahasiswa.

Diharapkan pula akan menjadi perhatian serta mendorong keingintahuan mahasiswa dalam mempelajari menggambar busana. Maka melalui penelitian ini diduga bahwa penggunaan metode II akan memberikan pengaruh hasil belajar menggambar busana yang lebih tinggi pada diri mahasiswa dibandingkan dengan metode I.

Tabel 3. Kelebihan dan kekurangan metode I dan metode II

Metode I (Kombinasi Metode Ceramah, Metode Pemberian Tugas, dan Metode Demonstrasi)	Metode II (Kombinasi Metode ceramah, Metode Pemberian Tugas, Metode Demonstrasi, dan Metode Sugestopedia)
I. Kelebihan a. Dosen mudah menguasai kelas b. Organisasi kelas dapat diatur menjadi lebih sederhana c. Dosen mudah menerangkan pelajaran dengan baik d. Lebih merangsang mahasiswa dalam melakukan aktivitas	I. Kelebihan a. Dosen mudah menguasai kelas b. Organisasi kelas dapat diatur menjadi lebih sederhana c. Dosen mudah menerangkan pelajaran dengan baik d. Mahasiswa lebih mudah memahami apa yang dipelajari

belajar individual ataupun kelompok e. Dapat membina tanggung jawab dan disiplin mahasiswa f. Dapat mengembangkan kemandirian mahasiswa di luar pengawasan dosen g. Mahasiswa lebih mudah memahami apa yang dipelajari h. Mahasiswa dirangsang untuk aktif mengamati, menyesuaikan antara teori dengan kenyataan, dan mencoba melakukannya sendiri.	e. Mahasiswa dirangsang untuk aktif mengamati, menyesuaikan antara teori dengan kenyataan, dan mencoba melakukannya sendiri. f. Dapat memberi ketenangan dan kesantaian g. Dapat menyenangkan atau menggembirakan h. Mempercepat proses pembelajaran
II. Kekurangan a. Mudah menjadi verbalisme (pengertian kata-kata) b. Yang visual menjadi rugi, yang auditif (mendengar) yang besar menerimanya. c. Menjadikan anak didik menjadi pasif. d. Mahasiswa sulit dikontrol dalam pengerjaan tugas e. Tidak mudah memberikan tugas yang sesuai dengan perbedaan individu mahasiswa. f. Untuk tugas kelompok, tidak semua mahasiswa aktif dalam mengerjakan tugas. g. Metode ini memerlukan keterampilan dosen secara khusus h. Fasilitas yang kurang memadai	II. Kekurangan a. Mudah menjadi verbalisme (pengertian kata-kata) b. Yang visual menjadi rugi, yang auditif (mendengar) yang besar menerimanya. c. Menjadikan anak didik menjadi pasif. d. Metode ini memerlukan keterampilan dosen secara khusus e. Fasilitas yang kurang memadai f. Hanya dapat digunakan bagi kelompok kecil g. Menggelisahkan dan menjengkelkan bagi orang-orang yang tidak menyukai musik h. Bahan masukan pendagogis dipersiapkan terlalu bersifat eksklusif.

Keunggulan metode Sugestopedia dalam mata pelajaran menggambar busana yaitu mahasiswa lebih rileks dan konsentrasi dalam menerima materi pelajaran dan dalam menggambar rangka balok dan rangka elips. Hasil pro testnya pun lebih baik dibandingkan dengan metode yang tidak menggunakan sugestopedia

HASIL PENELITIAN

Hasil Analisis Univariat

Untuk memperoleh gambaran tentang distribusi statistik variabel hasil belajar dengan menggunakan metode pembelajaran kombinasi I dan kombinasi II pada mata kuliah menggambar busana pada data numerik digunakan analisis deskriptif ukuran nilai tengah (mean, median, ukuran variasi dan standar deviasi) dan untuk data yang bersifat katagorik digunakan ukuran persentase atau proporsi, dengan hasil analisis sebagai berikut :

Hasil Belajar dengan Metode Pembelajaran Kombinasi I dan Kombinasi II

Tabel 4.1

Hasil analisis univariat berdasarkan variabel Hasil belajar menggambar Busana

Variabel	Mean Median	95% CI	SD	Min-Maks	Kolmogorov *(p-value)*
Treatmen 1	9,673 10,000	9,484 – 9,862	0,4678	9,00 - 10,0	0,000
Treatmen 2	9,864 10,000	9,656 – 10,071	0,6264	8,00 - 10,0	0,000
Kontrol 1	8,477 8,500	8,200 – 8,755	0,4676	7,00 - 9,5	0,040
Kontrol 2	8,346 8,000	8,049 – 8,679	0,6748	7,00 - 10,0	0,013

Hasil Analisis U Mann Withney

Analisis U Mann Withney dilakukan terhadap variabel independen yang bersifat katagorik 2 kelompok. Hasil analisis sebagaimana pada tabel 4.3 berikut ini :

Tabel 4.3

Hasil analisis bivariat dengan uji U Mann Withney

Topik	Metode Pembelajaran Kombinasi		Total n	*U Mann Withney*	*p-value*
	1	2			
Rangka balok	33,63	13,70	48	48,500	0,000
Rangka Elips	36,05	14,73	48	32,000	0,000

Pengaruh Metode Pembelajaran Sugestopedia terhadap Hasil Belajar Menggambar Busana

Proporsi rata-rata rank pada topik rangka balok dengan metode kombinasi 1 adalah 33,63, skor ini jauh lebih tinggi dibandingkan dengan rata-rata rank kombinasi 2 yaitu 13,70 dengan nilai U Mann Withney = 48,5. Berdasarkan nilai p-value = 0,000 (< 0,005) hal ini menyatakan bahwa ada pengaruh metode pembelajaran menggunakan kombinasi sugestopedia terhadap hasil belajar mahasiswa pada mata kuliah menggambar busana.

Pada topik rangka elips diperoleh rata-rata rank nilai dengan metode kombinasi 1 adalah 36,05 dan rata-rata rank metode kombinasi 2 adalah 14,73 dengan nilai U Mann Withney = 32,00. p-value = 0,000 jauh dibawah nilai ambang batas 0,005 yang artinya ada pengaruh metode kombinasi dengan metode sugestopedia pada hasil belajar mata kuliah menggabar busana, dimana nilai mata kuliah menggambar busana yang menggunakan metode kombinasi (dengan sugestopedia) lebih tinggi dibandingkan dengan nilai mata kuliah menggambar busana yang menggunakan metode kombinasi (tanpa sugestopedia).

\Kesimpulan

Berdasarkan hasil penelitian dapat disimpulkan bahwa hasil belajar mahasiswa pada mata kuliah menggambar busana yang menggunakan pembelajaran dengan metode II (kombinasi ceramah, demonstrasi, pemberian tugas, dan sugestopedia) memiliki rata-rata lebih tinggi dari pada hasil belajar mahasiswa yang menggunakan metode I (kombinasi ceramah, demonstrasi, dan pemberian tugas) pada bahasan rangka balok dan rangka elips.

Penerapan pembelajaran dengan metode sugestopedia memberikan pengaruh yang positif terhadap kegiatan belajar mengajar di kelas, karena dengan pembelajaran sugestopedia ini belajar menjadi lebih bermakna dan mahasiswa tidak hanya saling bekerjasama, berdiskusi dan membantu antara satu dengan yang lainnya namun siswa juga dapat merasakan suasana rileks dalam belajar, dapat mengembangkan kreativitas, serta dapat meningkatkan kecerdasan siswa. sehingga siswa dapat memahami materi yang diperoleh.

Berhasil atau tidaknya penerapan metode pembelajaran dengan metode II dalam pembelajaran di kelas, tidak terlepas dari pengaruh faktor-faktor lain. Diantaranya kemampuan dosen dalam perencanaan mengajar yang berhubungan dengan materi yang terkait dan kemampuannya dalam mengelola kelas serta waktu mengajar, pengaruh dari mahasiswa itu sendiri serta pengaruh dari lingkungan.

Lingkungan keluarga sangat mempengaruhi kegiatan belajar mengajar, seperti keadaan keluarga, demografi keluarga (letak rumah), pendapatan keluarga, serta jumlah keluarga, semuanya dapat memberi dampak terhadap aktifitas belajar siswa. Keadaan atau kondisi jasmani pada umumnya mempengaruhi kondisi belajar, karena kondisi fisik yang sehat dan bugar akan memberikan pengaruh positif terhadap kegiatan belajar individu. Jika faktor-faktor tersebut dapat dioptimalkan sebaik mungkin, maka akan menghasilkan bentuk pengajaran alternatif yang dapat meningkatkan hasil belajar siswa.

A. Implikasi

Hasil penelitian ini diharapkan dapat dipakai sebagai bahan pertimbangan bagi para dosen terutama dosen yang mengajar menggambar busana untuk menggunakan metode II (kombinasi ceramah, demonstrasi, pemberian tugas, dan sugestopedia) sebagai alternatif pembelajaran sehingga dapat mengurangi kejemuan siswa pada kegiatan pembelajaran, membantu mengembangkan dan mempraktekkan keterampilan-keterampilan siswa dalam hal mendesain dan menggambar proporsi tubuh, sehingga pada akhirnya dapat membuat siswa menjadi trampil dalam menggambar.

B. Saran – Saran

Dari hasil penelitian ini disarankan bagi dosen untuk merancang pembelajaran di kelas yang bukan hanya sekedar mencapai target materi tetapi juga dapat mengembangkan keterampilan dan kemampuan mahasiswa, salah satunya melalui metode sugestopedia atau dengan metode-metode lainnya, mengingat masih banyak metode pembelajaran yang dapat diterapkan.

Dengan adanya berbagai keterbatasan pada penelitian ini disarankan adanya penelitian lebih lanjut untuk mengetahui apakah metode sugestopedia dapat memberikan hasil yang lebih baik untuk materi pelajaran yang lain ataupun dengan sample yang dapat mewakili berbagai kelas dengan kondisi yang berbeda. Penelitian lanjutan ini sangat diharapkan untuk menguji kembali apakah metode pembelajaran sugestopedia dapat diterapkan pada semua mata kuliah dengan materi yang berbeda pada setiap jenjang pendidikan.

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STRATEGY TO ADOPT TECHNOLOGY IN DEVELOPING A LEARNING COMMUNITY: EXPERIENCE IN MANAGING ONLINE LEARNING

Dr. Johannes, S.E., M.Si[33]

Abstract.

Purpose. *The purpose of this study is to share the experience of managing online learning, begun with initiation, strategy, and the process of further development. Furthermore it seeks to provide aid in strategy implementation to empower lectures with the use of the Internet as the foundation for building a learning community.*

Design. *This study implemented the qualitative method. Hence, the instruments used to collect data were observation and in depth interviews over four years of implementing online learning. The observations are based on several classes with various subjects, especially those in management that implemented online learning. These were both in stratum 1 and in stratum 2. All the learning processes could be found on the network that was built to facilitate online learning.*

Findings. *This simple strategy, integrated with active learning, is the basis for the proper manner of building a learning community. Some findings which could be identified are: high levels of student-lectures interaction, student's encouragement, fair evaluations, greater responsiveness, increased creativity, soft skill establishment, and individual development. Furthermore, the boarder findings create a better perspective of the learning process which includes lecture implementation and organization performance. Meanwhile it should be noted that the online learning must be integrated with conventional face-to-face meeting methods, so that the broader learning experience is not neglected.*

Originality. *The research topic of this study is based on the experiences that began in a management class where the use of the internet was minimal.*

Practical implications*. This study meant to inspire lecturers to begin and develop online learning so that the internet may be categorized as a public good in the future. Hence, it would accelerate the learning community and be a massive step forward for education.*

Keywords; Online Learnig, Strategy, Learning Community.

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1. Introduction

The quality of learning is known to be a major and important determinant toward reaching a better condition. Lecturers and Teachers have a responsibility to increase the quality of learning. So, they must to implement a strategy fit to the goals and issues found in the classroom. Generally the quality of learning is determined by: (1) Human resource quality, (2) physical infrastructure, (3) lecturers competencies, (4) technology for learning, (4) lecturers' and teachers' promotions, and (5) quality of students.

As the internent may be accessed very easily and many applications are readily available, a lecturer has many options to pursue in developing a system of online learning. The internet's availability now provides many public resources which the student can easily find. This condition is further reinforced by the availability of cellular phones which can connect to many online learning facilities. Online learning however is a rigorous alternative which may encourage and transform the teaching and learning process. When lecturers use the internet as a basis to teach, some related terms are: 1) online learning, 2) web based learning, 3) e-learning. Technically the three forms are unique, but the substance is the same. In all three methods used to serve the students by employing the internet, the principle is the same, to provide for unlimited interaction, to create learning services which could enrich the learning experience through technology. This unlimited interaction would produce huge and varied advantages, not only to the lecturers and students, but also to the organization and community. The largest benefits would be established by creating an online learning process, depending on the manner employed as well as the lecturers needs for these online facilities.

The quality of learning and teaching can generally be distinguished by the institution's performance, due to differences in facilities, policies, and lecturer's competence. But those are not valid reasons to refrain from initiating online learning. Many simple applications can still be employed, such as word press and BlogSpot which are freely available to initiate online learning. The model implemented to build online learning is recognized to be web examined. Bekele, T. A. (2011) revealed that Internet–Supported Learning Environment in Higher School determinde by technology attributes, course quality, engagement, program format, and support services supported motivation and satisfaction in the student's tasks of choice, cognitive effort, persistence, skill, and achievement.

Based on this strategic consideration, the web may be employed by the lecturer to create an online learning plan, while considering the competence required and the uniqueness of each classroom to make the web both advantageous and sustainable. So, lecturers should implement the strategy in a manner most beneficial to the student and learning community as the online learning process is implemented.

On the online learning role and function, it is necessary to implement strategies to create a rigorous impact in order to establish a learning community. The strategy needed is one that can transform for both lecturers and students. This paper is based on the experience of managing online learning across several subjects in order to intrinsically establish learning communities.

2. Research Goals

The goals of this paper are to convey the experience of managing online learning that began with initiation, strategy, and web development. This experience will hopefully inspire lecturers to better serve students through online learning.

3. Methods

This research mainly used qualitative methods characterized by rich information of managing online learning. The primary source of information can be found in this address: http://johannessimatupang.wordpress.com and other blogs linked within. Data was collected, categorized, and analyzed to determine patterns.

4. Results and Discussion

4.1. Mainstream Technology in Education

The role of technology in education may be considered from two perspectives: 1) technology as output, and 2) technology as input. The role of technology in the education process can provide unlimited benefits. Hence every nation must prepare its own roadmap of technology to create consistent goals in order to support their development. Indonesia, as indicated by Zulhal (2010) set a goal of making the internet accessible to 50% of villages by 2015. This goal is now more easily attainable due to the fact that private providers have integrated internet connections into their products, including standard cellular phones. This condition is complemented by schools which require certain class to use computers and the internet in the teaching and learning process. The internet as a public good will provide every lecturer the opportunity to more efficiently organize and disseminate his/her service through online learning.

From an economic perspective, education belongs within services whose two main characteristics are interaction and intangible processes. As a service, the minimum requirement should be fulfilled, i.e. Service packages, delivery, and responses to ensure the service satisfies the user, Parsuraman, A., (2010). Furthermore, he identified three aspects: productivity, quality, and response which should be interlinked to each other to make the process satisfy the user. In employing online learning, these three are important to managing the service: online learning makes the volume the student receives greater and greater, the manner in which products and attributes are delivered is unlimited and thus the lecturer should implement serious quality control. Furthermore, the availability of the internet should be considered critically: the internet is a fixed cost so that the more lecturers use the internet, the more efficient the entire educational process established.

As an input, the internet is a great leap for the education process. The internet provides students with interactive lectures through unlimited online learning. Internet connections are improved everyday as easy software is publicly available. Lecturers can also develop individual plans for students through personalized web pages.

Demand for internet usage in teaching is very powerful, schools and colleges now prepare internet access not only to be more effective but also to generate other benefits. Elementary schools, in their International classes, have a prerequisite of both a computer and internet connection. Colleges are also preparing facilities to fulfill demand for the internet. In the case of colleges, the availability of online learning is still low. Some government universities meet only the minimum conditions, and they can't fulfill the needs of both students and other stakeholders.

In business, there are various models which could be implemented effectively and sustainably as marketing tools to develop the community. They use the internet to serve their customer. This business model could be used in online learning not only to provide interaction, such as sending material and responding to students but also to establish a learning community. The community could be enlarged to serve many more purposes.

4.2. Community Learning: Beginning in the Classroom

Within modern organizations, the community is expected to encourage their members to apply themselves, transforming their potency to achieve their goals. Members who are self actualized in any goal may establish great benefits for themselves (Apostolos, K., A., 2010). Wagner's definition identifies: *A community as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly"*. To complement this definition, Ryman, S., et.al. (2011) identifies communities as '*a general sense of connection, belonging, and comfort that develops over time among members of a group who share purpose or commitment to a common goal'*. Hence, member's acknowledgement, relationship, and readiness to participate and trust each other to achieve goals are the main characteristics of community.

A formal class, managed for one semester, belonged to a learning community. Lecturers are expected to transform the class into a community in order to achieve boarder goals beyond their individual scores at the end of the semester. As the class was managed, the students engaged have similar perceptions, readiness to participate and hope for a reward as they join the online community. Amstrong and Hagel, as Quinton, S and Harridge-March, S. (2010), identify various online community as having the following unique characteristics: *(1) communities of interest, (2) community of relationship, (3)community of transactions, and (4) community of practice.* Generally online learning has two forms in a college: (1) individually managed by a lecturer for their students, and (2) managed by a team that has the authority to publish items. Individual online learning has the advantage of lecturers free to add many attributes quite easily in order to make the students more engaged. But of the organization's consideration, online learning managed by a team is also important. Actually the two forms can be mutually supportive to make online learning very effective.

Compared to the traditional method of face to face, online learning has greater advantages, but lectures should consider the below criteria: (1) active and collaborative learning, (2) enriching educational experience, (3) appropriate level of academics challenges, and (4) student faculty learning (Robinson, C. C. and Hullingge, H., 2008). Those criteria are addressed to the lecturer. Furthermore, Ogunleye, A.O (2010) said the criteria for the students are: *learning environment, personal factors, pedagogical strategies and learning process*. Many academics have identified the benefits of online learning but the most importan thing is unlimited interaction between the students and lecturers, so that lectures and students may initiate and expand on any topic for discussion. The

benefit itself depends on the lecturer's strategy, the more interesting the online media, the more benefit. Finally, we must consider the online method as an intangible asset for institutions to generate greater benefits of value to the stakeholder where they get benefit to themselve.

The online community starts in the classroom. A lecturer has the important role to initiate, innovate and implement strategy. To make the strategy fit students' challenges with products from the web. Technically, lecturers may offer absolutely anything to the students, but providing too many superfluous products would only distract from the overall effectiveness of the web. In managing online learning, the various phases of student engagement in online learning are shown in Figure I. below.

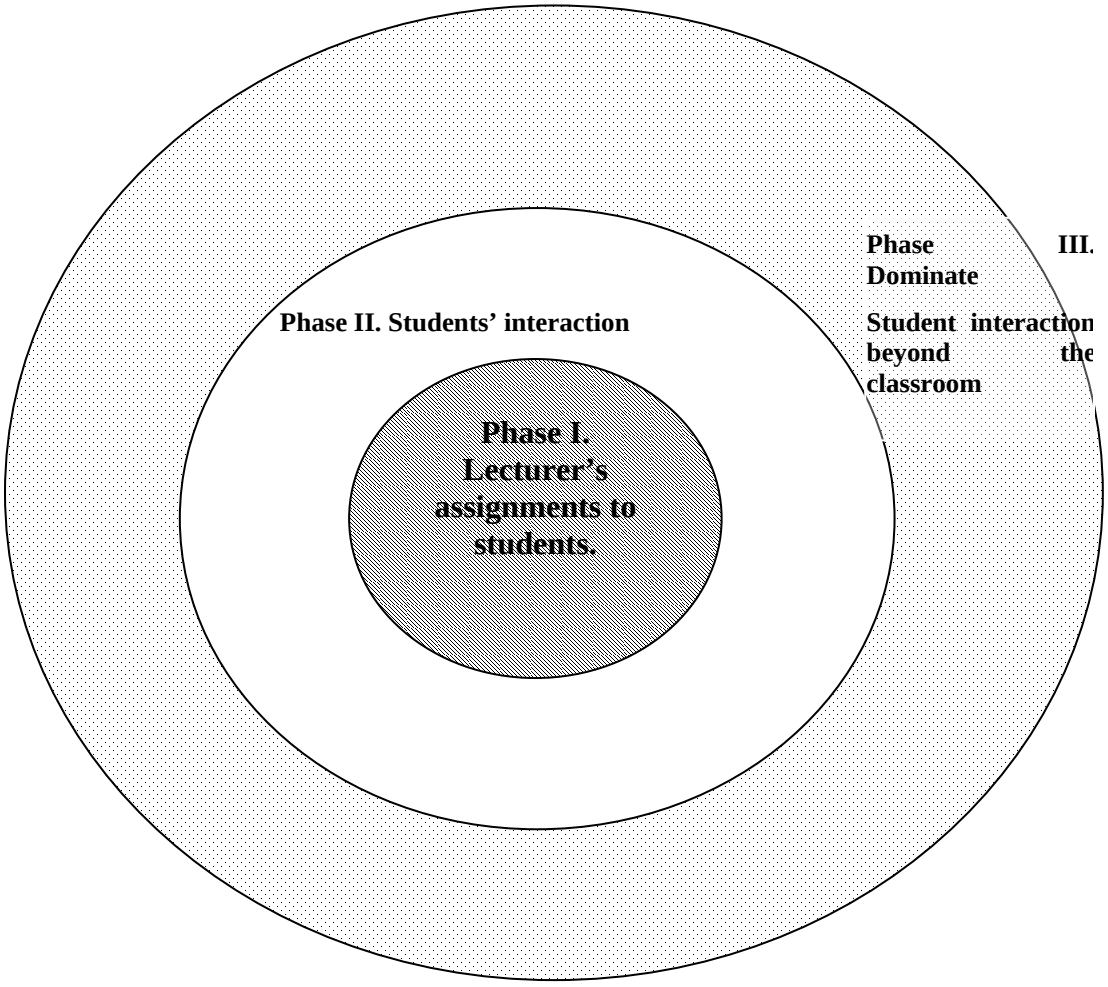

Figure I. Phase of online learning and students engagement

As demonstrated in Figure 1, student engagement in online learning is characterized by three different categories. These categories migrate through each phase showing the engagement progress. As the learning community progressed, Mazen, A.M., et.al (2000) identified that online transform student potency to reach boarder learning goals. The trasnfomation will succeed if llectures should also transform themselves as a provider to offer students many inputs for learning. The circles above are distinguished as follows:

Circle I. The initiation process is characterized by the lecturer's efforts to begin online learning. There the lecturer's function is dominant. Lecturers should offer assistance for the students' comprehension of lecture notes, teaching, learning programs and evaluation method. The most important aspect here is the lecturer's competency. He/she must transform themselves into an online provider, (Kabes, et.al, 2010). In this circle, the consideration of content is important to initiate online learning. The general adult learning process such as: 1) *students centered learning*, 2) *cased based teaching*, 3) *experiential learning*, 4) *collaborative learning*, and 5) s*ituational learning are important to be implemented* should be intrinsically designed here.

Circle II. This circle is characterized by student interaction individually or as a group. Students are assigned tasks in detail and conveyed adequate deadlines. This will make students eager to investigate deeper and deeper by doing desk research and using online sources. This circle occurs over one semester, ending with evaluation.

Circle III. Here are activities taking place after the semester evaluation is completed. Certain students may still need consultation to improve some proposal or another. In this circle, other students from different colleges may be involved.

The circles identified above are different across various online practices. Banking online for instance, has three different online services, i.e., 1) publishing, 2) interaction, and 3) transactions. Every category has its own challenges in need of technical solutions. These are not found in online teaching services, but the first two. To preserve online learning quality, lecturers should consider the general paradigms of teaching. Robinson, C (2007) notes six types of Bloom Taxonomy in adult learning, they are: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. Another type is Fink's characteristics which are: (1) foundational knowledge, (2) application focuses, (3) integration, (4) human dimension, and (5) learning how to learn. Whichever the characteristics are implemented, the lecturer should consider the general characteristics of adult learning: (1) experience, (2) beliefs, (3) motivation, and (4) active learning.

4.3. Experience in Online Learning for Classroom Activities

Managing online learning is mean to prepare and promote the learning community as can be shown in Table 1 below.

Online learning is simply a collection of web facilities that supported by a strong Internet connection. As the matter of fact, to be connected to the internet is not such a big issue anymore as students has more varied alternatives at cheaper prices.

Based on the Table 1, the most important implementation is a tight engagement. Students must read all of the commands and understand what is necessary of them. Furthermore, students should appreciate their own benefit and acknowledge them lecturer's contribution. Verbal appreciation may be used, such as making various comments. i.e., (1) your topics and title are good and should be continued, (2) your topics and title need to be improved, and (3) your topic and title should be changed. These three comments have different meanings; student knows that each comment shall affect the final evaluation. The evaluation activities of online learning could consider these aspects: 1) time to upload documents, 2) assignment completeness, and 3) additional

information from student's assignments. Meanwhile, the evaluation of online learning belongs to the non-examination process. All the aspects needed to be evaluated by lecturer may be found on the web. To give feedback in this manner, lecturers should consider politeness in order to continue student contributions. Insulting comments will discourage the student's involvement.

Table. 1. Subjects, Student Activities and Competencies Require.

No.	Subjects	Web Service	Student Activities	Note/ Competency needed
1	Research Method	• Research Note • Student Assignment • Project Proposal Consultation • Evaluation publishing.	• Downloading research notes. • Uploading Research Proposal • Improving proposal	• Propose Research Idea • Tentative proposal • **Student has no proposal, neglects their right to be evaluated.**
2	Advanced Marketing Management	• Research Note • Student Assignment (individual and group). • Student Interaction • Evaluation publishing	• Downloading research notes. • Choosing contemporary topics • Uploading assignment (Individual and group)	• Competencies on implementing concept and contemporary issue.
3	Strategic Marketing Management	• Research Note • Student Assignment (individual and group). • Student Interaction • Lecturer advise	• Downloading research notes • Choosing contemporary topic • Uploading assignment (Individual and group)	• Competencies on implementing concept and contemporary issue. • Exploring object to be proposed as project proposal.
4	Strategic Management	• Research Note • Student	• Downloading research notes.	• Competencies

No.	Subjects	Web Service	Student Activities	Note/ Competency needed
		Assignment (individual and group). • Student Interaction Lecturer advise	• Choosing contemporary topic • Uploading assignment (Individual and group)	on linking every topic toward the corporation based to strategic thinking.

Source. Summary Brief in Online Learning as Community May 2011.

(1) Research Method

This subject is very important for the students, as it is prerequisite for students to prepare their project proposal. If they do not pass the evaluation, they may not propose a research project. This simple rule is implemented to encourage students to propose their proposals. From the beginning, students are asked to choose topics and a research title. Lecturers should encourage student to eagerly explore relevant information useful for their research topic. To further encourage students, joint research may be used. Similar topics may be detailed in different theoretical constructions to give students more opportunities for new topics or research titles.

(2) Advanced Marketing Management

This subject is especially proposed to a marketing concentration, but it is not offered to all the management students. Lecturers here encourage student to comprehend contemporary issues and implement marketing concepts. To increase comprehension, the student is mainly tasked to recover a source from the web. This practice encourages everyone to learn how to find an online source.

(3) Strategic Marketing Management

This subject is especially proposed to the marketing concentration. Students are encouraged to explore recent topics with marketing concepts. Lecturers may sometimes add papers as a supplement for the students to review extra material.

(4) Strategic Management

The main characteristic of this subject is strategic thinking. Students should be encouraged to consider strategic thinking in the forms of: scanning external and internal environments, formulating vision and mission, and implementing the strategy. To give students a deep experience, they identified certain corporations to be examined. This is not difficult for students because corporations today promote themselves on the web where students can easily track them.

As a lecturer, all of the subjects above hold a tight connection. Issues could be found in Strategic Marketing Management subjects, and lecturers here direct students to explore deeper or offer to allow them to propose their own research project. To make students in tight engagement they area also required to put online resources in the web. In this way, others could trace the source whenever they consider they need it.

Online learning models may also produce unexpected teaching and learning objectives. A boarder objective which could be established would be to make significant progress for the community. Suzuki, C. et. al. (2010) finds that the benefits of the internet within the teaching and learning processes are: 1) expanding vocabulary, 2) sense of vocabulary, 3) greater foundation, 4) an opportunity for lecturers to reflect upon many topics anytime. Furthermore, Rachel K. and Victoria L. (2006), using CIP (*Collaborative Internet Project*), conclude that the benefits of internet are (1) connecting content to their new students' experience (2) active student participation , and (3) identifying the differences and appreciations of a group.

4.4. Implementing the Strategy

Adoption the strategy of online learning to establish community learning should be considered from the start of a lecture. Colleges that have special portals to conduct online learning tend to be conducted by a team. But, colleges without a portal may still implement online learning. They may do so by using a personal internet connection.

Individual online learning services have the advantage of lecturers being able to modify or add any attribute to the web to make each individual offering more beneficial. The strategy sometimes makes implementation difficult because lecturers may not have the proper competencies to support such efforts or the organization make proper use of their resources. In this case, we have to consider the simple rule in strategy as an alternative. Eisenhardt, K. M., and Sull, D.N., (2010) defined strategy as simple rules where the focus is the proces to generate value in production process.

According simple rules, strategies focus on doing better day by day to contribute value to the whole organization. In relation with online learning, lecturers do not have to be very complex, but just start with simple initiatives. The success of online learning is not in the organization's intervention, but rather on the individual's motivation to do increasing amounts of work. The most well known paradigm is: *"student learning comes first and technology follows"*. This translates to preparing an online model which the student must come to individually is the most important thing. As time passes, lecturers may consider other rules, such as: (1) preparing students, (2) promoting learning through discussion of the course, (3) managing communication, (4) incorporating multimedia, adn (5) evaluating the course.

4.5. Learned Lessons

The success of online learning does not depend on a single factor. Neumann, T and Neumann E, (2010) in their research implement Robust Model Learning (RLM) which identified a student's environment as the most important factor. Furthermore, what lecturers consider seriously is the learning model. There is no single model, models alone guarantee nothing sometimes. For poor student conditions, the blended model is the best to be implemented (Ayala, J.S., 2009). So face to

face learning is still beneficial for the students while they are also participating in online learning. Some important lessons which arose from the management of online learning were:

1) Engage students. In the beginning, lecturers may use their influence to engage students, but later a natural engagement may be established. This could be confirmed if the student found benefits in visiting the lecturers' website.
2) Improving content. Content is one of the three important determinants known as the 3C's (content, connection, and community) in online practice. Lecturers must improve at any opportunity the content of their paper, and invest in their performance there. But lecturers should create unique content that each visitor will only find on their website. By providing all of their ideas to the web, a lecturer can receive the most benefit from it.
3) Be transformed. Active learning is also an important model to be considered. So the role of lecturers must inherently transform as the environment changes. Lecturers and students should transformed together to establish the learning community not solely within the classroom but also beyond it.
4) Fairness. As online learning is purposed as a teaching and learning instrument, responses and evaluations are required to fulfill each student's needs.

5. Conclusion

5.1. The strategy of online learning is more determined by each lecturer individually than by the availability of physical infrastructure. In order to support online learning, student engagement must first be implemented, followed by incremental improvements.

5.2. Online learning inherently creates communities. So, lecturers must have important rules to keep the students' relationships intensive and activate so that the community may progress.

5.3. Inherent in the strategy, lecturers involved in online learning should consider the uniqueness of the web. This uniqueness will not only help the students understand more deeply, but also allow others to find various resources in the lecturer's website.

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STRATEGY OF MINDSET DEVELOPMENT COMMUNITY UNDERDEVELOPED VILLAGES FOR INDEPENDENT LIVING MANAGING RESOURCES IN THE AREA.

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Abstract

The purpose of this research is that community underdeveloped vilages, understand the potential him, and can live independently, if their potentials were combined to develop the village. The research method is to survey and field observations in the villages left behind, at District of South Central Timor NTT (Kabupaten Timor Tengah Selatan NTT), which is being developed by the Indonesian Services Heart Foundation. The population is Oeklani village, Meta village, Kolbano village, and the Pisan village. The sample was village Meta with 73 heads of families / households and 130 children. The results showed that develop the mindset the villagers left behind, to live independently through formal education, no success. The reason is the formal

educational activities done routinely, namely: teacher came to teach, teaching is finished go home. Harmonious communication between teachers and children, parents or community is very poor/less. Strategy of mindset development community underdeveloped villages, to live independently conducted by the Indonesian Services Heart Foundation quite successful, because have the harmonization between family groups numbering 73 families in the hamlet of Meta, because their children experience changes in behavior through informal education. The main strategy is to do, is develop the mindset of society according to their needs. That is their mindset is developed according to what they need. Their needs will be fulfilled by their own. Therefore it is necessary effort to get his needs.

***Keywords**: Developing mindset, community, underdeveloped villages, independent living*

Introduction

Poverty extraordinary is happening in the villages left behind, especially in countries that are developing, including Indonesia. This fact is very few people who can argue with this statement. According to Chambers, the population experienced poverty villages left behind, is an insult, because of the suffering, hunger, disease, ignorance / illiteracy, child mortality, can actually be prevented, because they are side by side with the welfare of people who call themselves rich [1]. Most readers, including writers, certainly much better than the tens / hundreds of millions of poor people, our neighbors on this earth Indonesia. The future of poor people in the villages left behind still dark. Sumardi and Dieter Evers, stating that poor people are on low incomes, houses made of bamboo / gedek, irregular houses, narrow streets and slums [2]. They need to be helped by us, the sooner the better, who should start? They need to be helped to help themselves. And that can help them is an outsider who has the power, resources, financial, and not the villagers or the poor. Based on this brief description, the Indonesian Services Heart Foundation, took part to help a small portion of poor people in Dictrict of South Central Timor NTT, in the field of community development. One of the activities are in education, special informal education, for children and parents were illiterate, because there are no education costs

Research purpose

The purpose of the research is the society of underdeveloped villages understand the potential for him and would be incredible if their combined potential to develop the village.

Research methods

The research method is through interviews and field observations in the villages left behind District of South Central Timor NTT, which is being developed by the Indonesian Services Heart Foundation. The population was 4 underdeveloped villages, the village Oeklani, Meta hamlets,

villages Kolbano, and the Pisan village. The sample was hamlet Meta with 73 heads of families / households and 130 children.

Research results

Knowledge of local conditions of the villages left behind, obtained from field observations during the trip to the hamlet Meta. Types of vehicles that can be used is a motorcycle. Development village / hamlet Meta including categories not built, because of poor road infrastructure, steep roads, dusty in summer, muddy and slippery in the wet season. Travel is dangerous, less comfort, the risk of running out of fuel and time, stay at home resident. Village / hamlet Meta, a distance far from the city, showing the spread of rural poor people, simple people's houses, roofs of palm leaves. Houses with dusty ground floor, stay together with pets, it is difficult to get clean water, pitch black at night, shows the level of difficulty of living of the people who are very heavy. Needed a helping hand outsider who has the strength and resources to develop and improve the lives of people in this poor village.

The largest part of poor people in the hamlet of Meta, with the rainy season and dry season, live from gardening or farming. Long dry season which often occurs, and a little rainy season, people's food problems, food prices are expensive and difficult to obtain, malnutrition, high mortality rates. complicate the lives of the people who are poor Government services is very less, visible from road transport is not good, steep, dusty, muddy in the rainy season. Drinking water supplies do not exist, even difficult to obtain, dark at night / no electricity. From the results of observation and interviews with residents, there has never been an official from the city who came to the hamlet Meta. In education, there is one elementary school / primary school and can not accommodate all children who want to school. There are still many children from the hamlet Meta, who can not school, because it is less able to buy clothes and school books. Thus the people are illiterate and uneducated more and more. From the results of observation and interviews, found the children who do not want to school, because it is not interested in school due to tradition and economic crush.

Discussion of results

Required development strategies, the mindset behind the village community, to live independently manage resources in the region. For the village or hamlet Meta, found the strategy development paradigm, developed by the Indonesian Services Heart Foundation. During this time, the development paradigm, the villagers left behind, to live independently, through formal education is not successful. The reason is the formal educational activities. done routinely, namely: teacher came to teach, finished teaching, the teacher went home. Communication between teachers and children, parents or community is very poor.

Therefore, we through Indonesian Services Heart Foundation develop the mindset development strategy rural communities behind to live independently, with the name: "Harmonious Communication between Sustainable Family Group" Harmonious communication between sustainable family group, there are 5 stages:

1. Introduction self / adaptation to the community
2. Know their needs / community
3. Giving life values to children / parents / community
4. The development of thinking through participation in harmony / harmonious meeting groups of children / families with a trainer / volunteer
5. Continuous mentoring from trainers / volunteers to the community

This strategy has been implemented by the Heart Foundation Serving Indonesia. After phase one and two, go to stage three and four, in which occurs the process of setting values, and development mindset. When used, for the activities per phase, long enough, depending on the community faced. This strategy is carried out through informal education, with harmonious communication, sharing system / split liver / experiences between fellow child / parent. There are learning while playing, giving the values and, developing the mindset, and ends with providing nutrition to children. Children are the bridge to reach out to parents, following the community development activities.

Of 130 children mostly illiterate unwilling to school, already there is a will for the school, after attending a community development activities. To distribute the group of children according to school age. His teacher was the volunteers, who had received training. Similarly, for the parents were divided into groups of 10 households, and led by one volunteer. The parents are given the values for the development mindset. Basically informal educational material is, to prevent five diseases society / nation, namely: disease education, economics, health, human resources / natural resources, and environment. The group has been running and independent, will always be guided by the trainers / volunteers who were given the task of mentoring.

Conclusion

Every province in Indonesia, has a large number of villages left behind, which is inhabited by poor people, who need the help of outsiders. Outsiders who have the power/strength, resources and extensive networking. It takes the right strategy to develop the mindset of the poor in underdeveloped villages, to live independently manage resources in the region. One strategy is quite successful, conducted by the Indonesian Services Heart Foundation, namely: "Harmonious Communication between Sustainable Family Group".

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THE DEVELOPMENT OF A MODEL OF COMPETENCE–BASED CURRICULUM (CBC) FOR THE PHYSICS SUBJECT AT SENIOR HIGH SCHOOLS

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Abstract

The objective of this research is to develop a model of competence-based curriculum for the Physics subject at Senior High Schools. The development of the model was conducted in three phases: need analysis, development of a model prototype, and a try-out of the prototype involving colleagues, experts, and students. The try out was conducted in (a) SMAN-1 Ciputat, (b) SMAN-1 Pamulang, and (c) SMAN-1 Cisauk. The results of the first phase revealed that despite the school's formal declaration that they had implemented the CBC, in reality (a) the class size was still too large (>30 students); (b) the teachers' work-load was still overwhelming, consisting of more than 20-hour instruction, preparation of lesson plans, assessment of students' work, extra hours for coaching and training students, and doing extra assignments; (c) the teachers did not consistently develop lesson plans, and there was also little innovation in them; (d) the teachers did not consistently expose the minimum standard of learning completeness to the students; (e) the availability of the facilities and infrastructures remained the same as they were before the CBC was implemented; and (f) assessment through portfolios had not been implemented systematically and sustainably as planned. The results of the second phase of the research revealed that the CBC model was just an adaptation of the school-based curriculum (KTSP) as the former did not appear to be very different from the later. It could then be concluded in the third phase of the research that, based on the statistical analysis, there was a significant difference in the students' learning outcomes as measured in the pre test and the post test developed under the proposed model

***Keywords**: Model of Competence-Based Curriculum, physics subject*

The existence of competence-based curriculum in 2004 is one of the logical consequence of strong desire to renew the system of education. In compare to curriculum in 1994, the 2004 curriculum is better, because it is more oriented to: 1). students' needs and varied areas, 2). diverse type of professional education, and 3). standard of graduation competences that applied nationally, but still consider the uniqueness of each area.

The implication of competence-based curriculum has resulted in changing of learning focus from content-based (what is stated) to student competences (the development of thought, learning

process, learning to do). Teacher and student are expected to know what they should attain and how far the learning effectiveness has been achieved..

The result of prior study of this research shows that implication of competence-based curriculum to learning strategy that is applied by teacher, seems to be less significant changes because the approach applied was similar to what was used before.

The resarch finding proves that teachers still assume that the CBC is theoritical. This was not only due to the lack of socialisation, but also because the application of this curriculum is in effective. Moreover, teachers' trainings of this curriculum were also not optimal. In fact, its realization was very different from the situation that supposes to be.

This fact was also well recognized by the head of curriculum development of National Education Ministry, who said that based on the research carried out in 2005 on the teacher competence, it was found out that the average level of teacher competence is on the value of 45. Apart from the reasons explained that CBC is new and has less supporting facilities, it requires strong commitment every concerned stake holders., especially headmaster and teachers, to be able to develop the CBC operationally, so that the lesson which is being relevant with recent students' needs and condition.

Based on the interview with teachers of Physics in three schools which were the research subjects, it was found that although the curriculum has changed, many teachers still have difficulties to change because it means they have to learn again.

The teachers who usually teach by applying "speech method" face difficulties, for example, has difficulties to move to demonstration method. This also happens to teacher who usually uses book as the only learning source. They have difficulties to change that method to be a presentation by using slide (Power Point Program). It was proven by the result of previous study in class where teacher took dominant roles and initiatives in learning process, while students were only asked to sit down, passively listen, and write a lot.

The result of field monitoring showed that these conditions were caused by: 1). Disabilities of teacher to make learning sylabus effeciently and effectively; 2). Ineffecient, ineffective and less attractive books; and 3). Disabilities of teacher to design learning messages in form of slide presentation (both PowerPoint Program and Flash).

Whereas, the director of Secondary Education of Ditjen Dikdasmen Depdiknas in National seminar of Mathematics and Natural sciences education in UPI Bandung explained that in a learning process, there should be five minimal models that should be used when teacher apply competence-based curriculum in class, especially for Mathematics and Natural Sciences subjects that are assumed as difficult subjects by students.

Those five renewal subjects in teaching-learning process involves: (1) the development of competence packages; (2). Designing the teaching and learning process in thematic form by combining various materials from two or more subjects; (3). The development on comprehensive study; (4) The collaborative learning ; and (5) the application of theory in the real life situation.

With respect to the above concept, further discussion for this study should be focused on the development a specific model of the CBC especially for the physics subject matter for the first grade of senior high school student.

Having found that there are still many teachers who do not understand the basic concept of CBC, lack of motivation in the implementation of CBC, lack of supporting facilities, so it is considered necessary to conduct indepth study on the extent of the CBC has been implemented in the field, what problems are faced by the school, teachers and students, and what are alternative solution offered to solve the problems..

This research was conducted based on the natural event phenomena of the exisiting condition and what should exist at the time of the CBC implemented in the classroom. Then the the operational technique for problem solving developed based on the result ofcurriculum development, which is then called as the model for competence –based curriculum (CBC) especially developed for the teaching of physics in Senior High School.

Based on the background of the study stated above, it is necessary to conduct a research aimed at studying the development of a specific model of competence-based curriculum for the subject matter of Physics for Senior High School

Method

This study is a kind of research and development (R&D), which generally divided into two main research methods: (A). Research method for the phase of need analysis, and (B) Research method for the phase of development.

The research was conducted in SMAN-1 Ciputat (X), SMAN-1 Pamulang (Y), and SMAN-1 Cisauk (Z) that is located in Tangerang regency. It had been started since the even semester in academic year 2004/2005.

Result

The result of this research shows that the three schools being observed have implemented the CBC to various extent.. They have relatively comparable profile in terms of classroom facilities. The three schools have no air conditioners, the classrooms were not well maintained, and the available teaching and learning media and practical equipment were not used effectively.

The size of the class was still too big (> 30 students), the work load of the teacher was also too heavy (>20 hours meeting), while in addition to that the teachers were still assigned to prepare lesson plans, conducting evaluation of the learning activities, guiding and training the students and conducting other additional activities needed.

In the middle of the teaching and learning process, tghe teachers seemed to be highly dependent on the text book owened by the teacher only. In this way the teacher tend to neglect the Leson Plan (RPP) that was prepared, therefore, the activities were more oriented to the leson material rather than to the development of student competence: the skill on “how to think, to learn, to give respond, and to do something”

The time given by the teacher for students to ask questions was not properly responded by the students. Most of the teachers did not provide enough time for detecting the achievement of student at the end of teaching and learning process.

.The existence and conditions of teaching media for practical work was the same as when the CBC was not yet put into effect, and the the respond of the teacher to the implementation of CBC was positive , although the teachers realized the difficulties in fulfilling the requirement standard as in the reality that in many cases education has not been managed carried out professionally.

. Although the schools are located next to the Center for Science and Technology (Puspitek), this institution has not been used to help support the teaching and learning process. In other case, the class evaluation system or portofolio applied by the teacher has not been developed properly. Regarding the fulfilment of the 8 minimum national standards required for running good education program set up by the government, it is problematic for the institutions because the support facilities needed are very limited. In his case the government seems to be half committed.

The result of this research shows that there is significant difference between post test score and pre-test score of the student from the implementation of CBC develpped by researcher in the model of (1) conceptual model as the development of theories and integrated principles developed for the CBC for physics subject matter. (2) Procedural model developed based on Dick and Carey, Tyler and the concept for developing the School unit –based Curriculum, and (3). Tried out Model of teaching and learning materials and teacher's guide book.

The result of this research can be concluded that if the curriculum is well designed and developed systematically, the learning achievement of the student can be enhanced significantly, as the logical consequence of the effective and efficient as well as attractive teaching and learning process

The result of study indicates that there is a significantly difference between student's pre-test and post-test score from the model of application result of CBC which is developed by researcher in form:(1) conceptual model, which is realization from theories of conceptualization and principles which are integrated for making model of physic CBC; (2) procedural model, which is indicated to Dick and Carey model; Tyler and School Based Curriculum concept; and (3) physic model, such as material and teacher's guide which has tried out already.

From this study, it can be concluded if curriculum is made and developed intentionally, programmed and systematic so that the student's result will increase significantly because the objective will be efficient, effective and attractive.

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ETHNOECOLOGY, ETHNOMETHODOLOGY AND MODELING COMPUTER SIMULATION

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Abstract

Indigenous and global knowledge systems are alternative pathways in the human/scientific quest to come to terms with the universe, and are the result of the same intellectual process of creating order out of disorder. Indeed, as Clark illustrates, the very roots of Western science and philosophy are based on the observation and political interpretation of local observations of nature. ethnoscience focused on indigenous knowledge systems in the context of development and change. Changing attitudes towards indigenous peoples will be reflected in a new dynamic ethnoscientific view which combines both formal and empirical observations. The operationalization and implementation of a participatory ethnosystems research methodology is urgently needed for the assessment, the world's present environmental predicament. Traditional Ecological Knowledge ***(TEK)*** *also referred to as Indigenous Ecological Knowledge* ***(IEK)*** *The INDAKS computer model of integrated agricultural behaviour and its components, included the* ***tangible and intangible accountabitily factors*** *among for development and project.*

1. Introduction

ETHNOECOLOGY, ETHNOMETHODOLOGY AND MODELING COMPUTER SIMULATION TRY TO contribute to the Global Biodiversity Assesment. The practice of science, including belief and magic, forms a fundamental characteristic of all human societies. (Bronowski, 1981)

Almost parallel to Western 'scientific', cosmopolitan or global disciplinarity, indigenous, traditional or local knowledge has developed in situ to encompass the holistic, inter-disciplinary wisdom, practices and experiences of local communities and ethnic groups.

Despite efforts to list theoretical binary oppositions between indigenous and global knowledge (such as qualitative versus quantitative, intuitive versus rational, holistic versus reductionist, and spiritual versus mechanistic), such distinctions cannot easily be made. Many components of indigenous knowledge systems are presently being studied, documented and made available to the world

community, to link up eventually with te ex situ global knowledge systems that are easily accessible in print and in data bases.

Indigenous and global knowledge systems are alternative pathways in the human/scientific quest to come to terms with the universe, and are the result of the same intellectual process of creating order out of disorder. Indeed, as Clark illustrates, the very roots of Western science and philosophy are based on the observation and political interpretation of local observations of nature.

Thus the scientific methods and techniques developed and used for the study of global knowledge systems can be – and have been – adapted, refined, tested and used to study and understand indigenous knowledge resources.

These different pathways reflect an arduous process of assessment, recognition and emancipation of indigenous peoples and their knowledge systems. This progress has passed from the interest of early ethnologists In the exotic, through the colonial and post-colonial concerns over primitive peoples, and on to the currently emerging new ethnoscience focused on indigenous knowledge systems in the context of development and change.

2. Problems

The most of modern people in the world are not familiar about the Indegeneous. They think that modern the only technology can make them success to obtain much money to fulfill the list of basic needs, but they are not concern about the environment basically and ecological wisdom. Let us know that The less of indegeneous knowledge will be the ruin. The best citizen is the people who appreciate to their history and heritage. In several countries has been appropriate the various technology for maintain the indigenous. Changing attitudes towards indigenous peoples will be reflected in a new dynamic ethnoscientific view which combines both formal and empirical observations. The operationalization and implementation of a participatory ethnosystems research methodology is urgently needed for the assessment, the world's present environmental predicament.

3. Solution

The modern agro industrial big scale in the some area will give the effect to the transformation and modernization, included with skill power, land conversion, utilize of modern technology, transportation, the big capital. Its very contradictive situation with the indigeneous peple overthere, They are not familiar with the modern technology in modern agricultural system, with limited human

power, they habit and depend on the forest production for daily lliving and habituation. In this situation, the indigeneous people must face to face with the giant modern agriculture.

In the approriate of economic policy, In this contecs, government have to think what the kind of social integration of them, to unity of two peradaban. History and experience according with this contecs in Java, Sumatra, Celebes, Papua already race of the conclict among of the local indegeneous people in the social and transformation of modern technology. So many factors have to think the specific (tangible and intangible) accountability for development or the project.

Poverty, sensitivity of disintregation issues among of the indegeneous people can not answer directly witth the gint project overthere suddenly, with the jargon : *food security defence and economic rice for the prosperity*. Its very clear for them that the giant project is the vested interest mayority of the investors and marginality of local indigenous people. How about the the *progrowth, propoor, pro environment, pro job?*

3.1. Cognitive anthropology, ethnoscience and TEK (Traditional Ecological Knowledge)

The new ethnoscience approach sought to replace the researcher's own perceptual categories with those describing the organizing principles that underlie culture and behaviour. Through comparative studies in different cultures, researchers using this approach attempt to discover how the human mind functions in order to infer general clues to behaviour.

In contrast to anthropology as an empirical science based on observable data, cognitive anthropology has become a formal science involving a mentalist approach to the study of the principles and ideas underlying behaviour, rather than the behaviour it self (Applebaum 1987). Assumptions about the culture under investigation are made on the basis of the generalizations perceived by the informants/participants.

In the present volume, a particularly interesting sub-set of ethnoscience deserves special attention, and that is ethnoecology-defined by Hardesty (1977) as, the study of systems of knowledge developed by a given culture to classify the objects, activities and events of its universe.

Traditional Ecological Knowledge **(TEK)** also refered to as Indigenous Ecological Knowledge **(IEK)** – primarily encompasses local knowledge of plants, animals, soils, etc. and the associated experience and wisdom of human interactions with the environment (cf. Johannes 1989; Inglis 1993). Berkes (1993: 3) defines TEK as "… a cumulative body of knowledge and beliefs, handed

down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

Initially TEK remained rather formal in its orientation, but gradually it developed to encompass the use and management of agricultural and other natural resources, eventually becoming an essential element in local decision – making and planning activities. TEK also includes the invisible socio-cultural context of knowledge systems.

Berkes (1993: 5) observes the following three dimensions;

a. Symbolic meaning through oral history, place names and spiritual relationships,
b. Distinct cosmologies or world – views as conceptualizations of the environment,
c. Relations based on reciprocity and other beings, and resource management institutions based on shared knowledge and meaning.

This wider perspective has recently attracted renewed attention, particularly in agriculture where farmers experimentation and accumulation of experience is guided by their holistic cosmology, or cosmovision (Van den Berg 1991; Grillo 1991).

Cosmovision refers specially to the way in which the members of a particular culture perceive their world, cosmos or universe. It represents a view of the world as a living being, its totality including not only natural elements such as plants, animals and humans, but also spiritual elements such as spirits, ancestors and future generations. In this view, nature does not belong to humans, but humans to nature.

As the concept of cosmovision includes the relationships between humans, nature and the spiritual world, it describes the principles, roles and processes of the forces of nature, often intertwined with local belief systems. As Haverkort (1995: 456) notes: '…. It makes explicit the philosophical and scientific premises on the basis of which intervention in nature (as Is the case in agriculture and health care) takes place'.

Although not always immediately identifiable, the prevailing cosmovision of the members of many indigenous communities guides and regulates a complex of socio-cultural phenomena such as the organization of the culture and the way of daily life, and determines to a large extend the way in which goals are achieved. The study of cosmovisions requires a special research methodology to deal with extra-scientific factors and variables that are often invisible to outsiders, including variations along gender lines IUCN/UNEP/WWF (1991).

3.2. The Dynamic Context of Knowledge Systems Interactions

This strategy initially fostered high hopes for socio-economic development and growth, but an increasing number of disappointing development programmes and projects introduced by outsiders who tended to ignore local experience and wisdom provoked an international call for alternative solutions.

The pioneering work Indigenous Knowledge Systems and Development (Brokensha, Warren and Werner, 1980) heralded a new ethnoscience in which indigenous knowledge systems were seen in a more dynamic perspective within the development process. Since the publication of this work, an increasing number of applied studies have highlighted the crucial role that alternative knowledge systems play wise, the 1978 World Health Organization conference in Alma Ata highlighted the potential of indigenous systems for more participatory and sustainable health systems.

This led the way to a new, more dynamic field of ethnoscience research in other sectors such as agro ecology - the management and conservation of agricultural and natural resources. Since then, studies in disciplines such as anthropology, agriculture, fisheries, forestry, ecology, biology, botany and medicine have begun to document the adaptability and viability of local systems for the international development process (cf. Posey 1985; Richards 1992; Chambers, Pacey and Thrupp 1989; Warren 1989; Mazur and Titilola 1992; Fairhead 1992; Slikkerveer 1991; Leakey and Slikkerveer 1991; Mathias Mundy 1992; Warren, Slikkerveer and Brokensha 1995; Posey and Dutfield 1996).

This new approach has also had implications for the dominant top-down development paradigm. In international development strategies, the newly developing field of Indigenous Knowledge Systems and Development paved the way for the current shift toward sustainable development which explores alternative modes of knowledge generation and exchange.

The strategies of sustainability and grass roots participation, promoted by the Brundtland Report (1987), have pointed to a more realistic Farmers First paradigm (Chambers, Pacey and Thrupp 1989) in which indigenous practices are included in bottom up agricultural decision making and planning processes.

3.4. Ethnomethodology and The Ethnosystems Approach

For a better understanding and explanation of the indigenous perceptions, practices, beliefs, values and philosophies associated with biological and cultural diversity, answers have to be found for complex methodological questions. Could appropriate parameters be developed in conjunction with local communities in order to validate such indigenous concepts in comparison with similar global phenomena?

How could invisible phenomena such as indigenous cosmologies, belief systems and attitudes be recorded and analysed in a scientific mode? In what way could individual (subjective) variables of perceptions and ideas be transformed into systems (objective) variables for value-free measurement and comparison? Could indigenous knowledge systems in general be compared with Western reflective knowledge systems ?

The answers would eventually be found in a methodology that goes beyond more qualitative interpretations to include comparable quantitative data that could be encapsulated in multivariate models.

Ethnomethodologies were introduced in the 1960's by Garfinkel (1964) and Cicourel (1964). Ethnosystem methodologies facilitate the assessment of the cognitive and behavioural components of particular groups or communities as systems in a holistic mode, and facilitate the elaboration of the concept of culture as the result of historical processes of acculturation and transculturation in a more dynamic way.

They also employ the well-known techniques of participant observation, semi-structured interviews, triad ranking, the construction of transects and the use of community cartography in close co-operation with members of the community.

However, as the ethnosystems methodology seeks to pertain to a better understanding of indigenous knowledge systems, and at the same time enhance a non-normative, more realistic comparison between indigenous and global systems of knowledge and technology, it adds a combination of three more methodological principles:

- Participant's View (PV)
- Field of Ethnological Study (FES)
- Historical Perspective (HP)

Thus, the ethnosystems approach seeks to contribute to the establishment of a common ground for realistic comparisons of different indigenous and global knowledge systems in order to bridge the gap through a broader, non-normative (emic) framework for regional comparative and (pre) historical analysis. For TEK, the implementation of this methodology refers to the further operationalization of its adaptive potential to complement and synthesize with global knowledge systems in complex ecological settings that include such areas as practicality, world-view and belief systems.

Similarly, the inextricable link between biological and cultural diversity, as highlighted by Posey (this volume) also transpires through the analysis of the complementarity of cultural and biodiversity manifest in the project on Indigenous Agricultural Knowledge Systems (INDAKS) carried out in Kenya and Indonesia in collaboration with LEAD at Leiden University in The Netherlands and MAICH at Chania, Crete (1993-1997).

Using the ethnosystems methodology it has been possible to quantify the individual participants view – perceptions, beliefs, cosmologies, attitudes and opinions – as systemic socio-demographic variables and insert them into the predisposing variables as background characteristics. In this way, it became possible to compare different blocks of predisposing, enabling and system variables in a newly-designed computer model of integrated Agricultural Behaviour and its components, and identify specific determinants of sustainable use of agro ecological resources (cf. Slikkerveer 1990, 1996a; Figure5.1).

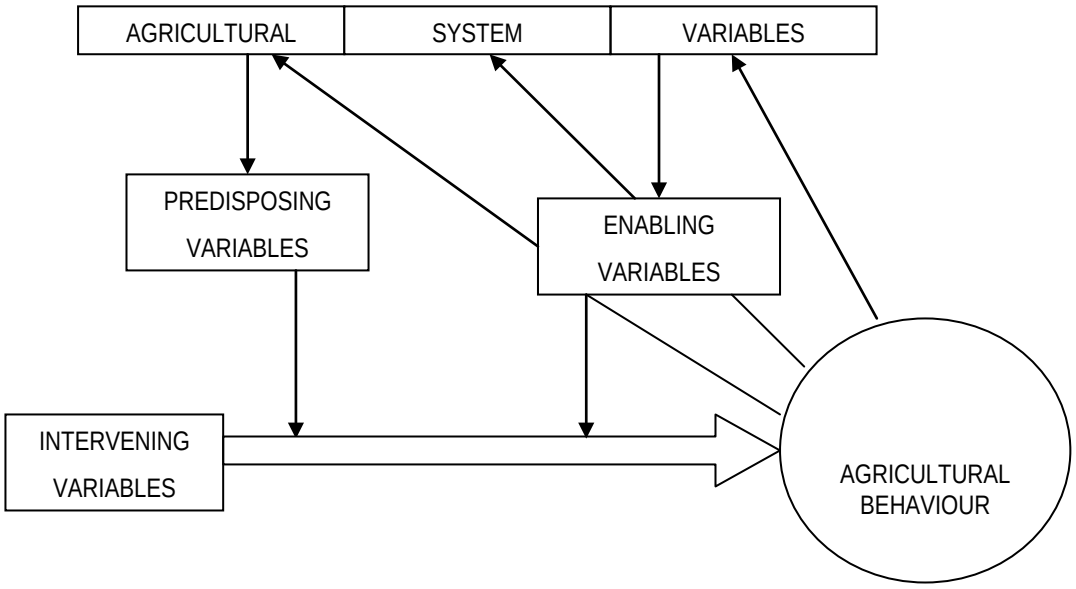

Figure 1: The INDAKS computer model of integrated agricultural behaviour and its components (Slikkerveer 1996a)

3.5. Towards Conservation of Bio-cultural Diversity

In the quest for a global solution to the conservation and management of biodiversity, one of the key issues is related to the age long enigma of **Humans place within and not above Nature** (Leakey and Slikkerveer 1993). While Western ecological theories have tended towards stewardship of the earth and control over and exploitation of natural resources, most indigenous ecological principles are largely concerned with experience, sustainment and prediction in relation to human subsistence and survival.

These principles include values, norms and beliefs regarding the maintenance of the balance of nature which have evolved over generations, and which encapsulate specific conservation methods and practices.

Their concern is over the approaching loss of the related cultural diversity in terms of rapidly disappearing local and regional systems of knowledge and practice of the predominantly traditional and indigeneous peoples around the globe.

This kind of TEK has been only partially explored and recorded, despite the threats that face the rich faunal and floral resources of many regions of the tropics. Among the pioneering projects studying indigenous perceptions and practices of biodiversity management and conservation in West and East Africa, Southeast Asia, the Pacific and the Amazon region, is the interdisciplinary People, Land Management and Environment Change (PLEC) program, currently being implemented by the United Nations University (UNU).

3.6. People, Land Management and Environment Change (PLEC)

Harold Brookfield said that PLEC is a project of the United Nations University (UNU), approved in 1997 by the Council of the Global Environment Facility (GEF) for implementation under the GEF work-plan, with the United Nation Environment Programme (UNEP) as impelemnting agency and executed by UNU. The project, initiated in a small way in 1992, has had a long preparatory phase during which a great deal of targeted research has been undertaken on small farmers and their management of the environment.

PLEC brings together the guided work of five clusters of scientists for common aims in the testing and demonstration of good farmers practices in conservationist and sustainable resource management. There is particular emphasis on conservation of biodiversity, including crop biodiversity. Diversity in resource management practices, crop biodiversity, and the dynamism of

change in farmers adaptations, together define the agrodiversity which is central to PLEC work (Brookfield and Padoch 1994).

The clusters are in West Africa (Ghana and Guinea), East Africa (Kenya, Uganda and Tanzania), China (Yunnan province), Papua New Guinea and Brazilian Amazonia. There are associated groups, outside the ambit of the GEF project but within UNU/PLEC, in Thailand, Mexico, Jamaica and Peru. Each contains experienced as well as more junior scientists, and students. All groups are multidisciplinary, with both natural and social scientists working together. The core of PLEC work lies in its demonstration sites, where scientists learn from farmers, and facilitate the demonstration to others of successful techniques developed by the best farmers.

The demonstration sites belong to the rural people, and the work done in them is the farmer's own. The scientists role is to measure and evaluate what they do, help select what is best and most likely to be sustainable, and get behind the farmers own experimentation. Demonstration sites have already in operation, co-operating farmers have been identified, and plots have been set up for measurement and experiment.

PLEC places its primary emphasis on what farmers do. The local knowledge that underlies their practices is unequally distributed among farmers of both sexes and is not always shared. More over, it cannot be understood outside the social and cultural context in which knowledge is handed on, and in which new information and experience are interpreted. Scientists interpretations of information they gather on local knowledge have to be drawn up in relation to the farmers own perceptions, best first approached through close observation of the practices that are followed. PLEC views local knowledge not as a fixed or traditional pool, but as constantly changing, being renewed by information and experience, and tested by ongoing experiment. This in turn is the basis of dynamism in peoples farming systems on which PLEC relies for success in extracting best elements from peoples own resource management practices.

East cluster has its special strengths. The analysis of biodiversity in an agricultural context is strongly developed in Yunnan (China), West Africa (Ghana, Guinea) and Amazonia (Brazil). The Papua New Guinea group has gone further than others in the quantitative analysis and mapping of agricultural systems using diagnostic characteristics. The East African cluster has particular strength in the dynamics of soil and water conservation in diverse and sensitive environments.

Promotion of South-South interchange across the network is one important strategy by which to share expertise. North-South networking in support of clusters attainment of their objectives relies on the three Scientific Coordinators who keep in close touch with clusters, and on Scientific Advisors appointed on limited term contracts to provide particular expertise in areas such as, for

example, biodiversity measurement, soil degradation assessment, GIS applications, or experimental method.

The Coordinators visit clusters from time to time, and Scientific Advisors will be specifically charged with missions to particular clusters. Networking has also been achieved by correspondence, and by regional and general meetings held in period 1993-1997 in West and East Africa, Southeast Asia and Amazonia. The project periodical PLEC News and Views, a newsletter with substantive articles, is of major importance, being made available to all PLEC members as well as being a vehicle for wider information to interested parties. Eight issues have been published on an approximately half-year schedule, and PLEC News and Views now has distribution of 400 copies.

4. Summary

The method used in a demonstration site varies in detail from country to country. Often, it begins with a joint inventory of resources and their uses, and goes on through participatory appraisals (using both formal and informal methods) of participatory re-structuring of land use, which includes conservation of threatened natural or quasi-natural areas. Along the way are biodiversity inventories and soil surveys, and determinations of the problems faced by farmers which constrain their freedom of decision. Operationally, the joint team of farmers and scientists then experiments with tried crops and methods, and introduces innovations. Scientific observation, monitoring and measurement of outcomes are continous ; technical help is provided on demand. Later, the participatory approach is popularized among other communities, and demonstrated to officials and policy-makers. Finally GIS and field methods are used to find areas in which similar solutions can be adopted.

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FUNGSI INFORMASI ACUAN MERAKIT TES

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Abstract

The development of information technology and software a significant impact on the field measurements. Item Response Theory (IRT) is the modern measurement theory that requires information technology to perform various calculations. Calculation of the IRT quite complex and needs to be repeated many times and have high accuracy. In classical measurement theory we know the analysis of item difficulty index and the discriminate index. Information difficulty index and the discriminate index the classical theory relies heavily on the test participants. Item difficult in group A is not necessarily difficult in group B. This means that there are characteristic item size dependence to the group of test participants and existing participants dependence characteristic size to the group of test items. One way to overcome this is to use the concept of IRT. By using IRT theory tests measure the ability of participants will remain invariant to the group of items or tests, and vice versa. To achieve this IRT construct a model that links characteristics of test participants with the characteristics of item. The relationship model is made applicable to all item groups and all groups of participants with no dependency to one another, with a number of specific requirements. Item Information Function is one of the application of IRT. By using the value of information function we can choose which items are most appropriate for the test participants. When the test device is prepared or assembled, we can determine how to form the test information function. After the test information function is determined, the items sought so that the combined function item information they generate the target information function test. Such a test device assembly requires unloading item pairs, checking whether the target test information function can be achieved. For that we need item bank to select the appropriate item.

Keywords : Item Response Theory (IRT) information function

1. Background

One way to look at the ability of students is through tests. Cangelosi said that, the measurement is the process of collecting data through empirical observation. The test is also used as a selection tool for new admissions, new hiring and other selection. Before the tests given to students these tests need to be made or constructed in accordance with its intended purpose. In the classical theory if the test is usually the team will assemble assembler will see analysis of item difficulty index and discriminate index, unfortunately the two traits are highly dependent clause to the group of test participants. That is a difficult point in group A is not necessarily difficult in group B, and vice versa. This means that there is dependence between item characteristics with the characteristics of the participant or vice versa. One way to overcome this is to use the concept of Item Response Theory (IRT). By using this IRT theory tests measure the ability of participants will be fixed or invariant to the group of test items, and vice versa. To achieve this IRT construct a model that links characteristics of test participants with the characteristics of item. The relationship model is made applicable to all item groups and all groups of participants with no dependency to one another, with a number of specific requirements. Item Information Function and test information functions Two Parameter Logistic Model is an application of IRT. By using the value of the test item information we can choose which items are most appropriate for the test participants.

2. Theoretical Study

2.1. Item Parameters

On Item Response Theory (IRT) difficulty index and discriminate index characteristic parameter known as item. Discriminate index notated = a while given the difficulty index notation = b, both parameters affect the probability of correctly answering a test participant at a particular point. In the two parameter logistic model is a model approach similar to the normal ogive model the probability of answering correctly a participant is

$$P_i(\theta) = \frac{1}{1 + \exp^{-Da_i(\theta - b_i)}}$$

Description:

$P_i(\theta)$ = Probability of a test participant with the ability to answer the i-th item correctly.

ai = discriminate index

bi = difficulty index

D = 1.7 Numbers constant

e = 2.718 Numbers constant

Application of the probability of answering correctly use the formula which is calculated based on the level of ability can be seen in table 1 as follows, and at the same item characteristic curves can be seen:

Let $-Da\beta(\theta$ = X

Table 1. The calculation of probabilities to answer correctly the two-parameter model for a = 1.5, b = 1.0

θ	X	1 + EXP ^{X}	Pi (θ)
-3	10.200	26,875.749	0.000
-2	7.650	2,099.980	0.000
-1	5.100	164.935	0.006
0	2.550	13.804	0.072
1	0.000	2.000	0.500
2	-2.550	1.078	0.928
3	-5.100	1.006	0.994

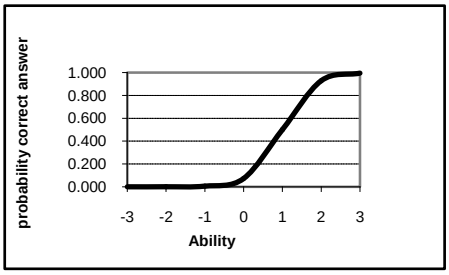

Figure 1: Item characteristic curve with a = 1.5 and b = 1

Based on Table 1 and Figure 1 shows that the probability of answering correctly to the same parameter values will result in increasing the probability value according to the ability of the test participants. The higher the ability of the test participants, the higher the ability to answer correctly. The amount of test participants the opportunity to answer correctly determined by the index kesukarannya. The higher the index of test difficulty (more difficult) the opportunity to answer a test item correctly also lower. If the value of the ability of the test participant is θ, and item difficulty index is b, then the relationship between the two values can have the following possibilities: 1. value b> value θ, 2. b value <value θ, 3. value b = value θ

The first possibility if the difficulty index (b) is greater than the value of the ability and the difference of the value is quite high then the chances of correctly answering item will be vanishingly small. Conversely the second possibility if the value is lower difficulty index of the ability and the

difference of the values are quite high mean difficulty index value is far below capacity, the opportunity to answer correctly get bigger. Meanwhile, a third possibility is the difficulty index value equal to the ability of the test participants answered correctly then the probability will be maximum in accordance with the ability of the test participants.

In addition to our difficulty index can also look in more detail about the parameters of discriminate (a). Item of the tests have low discriminate is a test item that tests can not distinguish participants with high ability with low ability test participants. Test item that has a high discriminate can be seen by the sharpness of the arch curve.

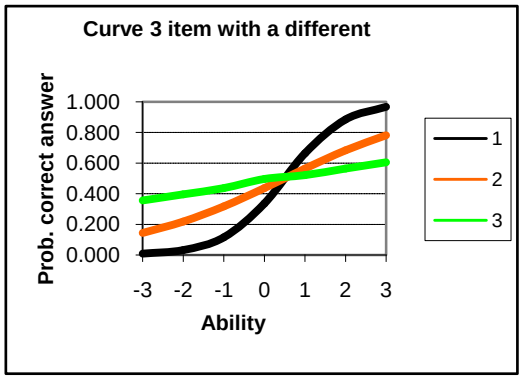

Figure 2: Characteristic curve Item 1 through Item 3

Based on Figure 2 shows that the third item is the item that has the same difficulty index of 0.5 but has the discriminate index of different indices. Item 1 discriminate index higher than items 2 and 3, so that the characteristic curve is steeper than the point 1 to point 2 and 3, this means that item 1 is a item that can distinguish between groups of high-test participants with low group. While point 2 and 3 are the items that have a discriminate index, this seems characteristic of item point 2 and 3 horizontal.

2.2. Essentials of Information Function

The function of information on item response theory relates inversely with uncertainty. This means that the higher the uncertainty, the lower the value of information function. Conversely, the lower the uncertainty the higher the value of information function. This is in line with Fisher in Baker's opinion that defines the function of information is reciprocally related to the precision of a parameter that can be measured. So, if we can measure the parameters appropriately, we will know more about parameter values than if we only estimate with accuracy the less. Statistically, the accuracy of estimated parameters and measured by the variability of parameter values. Based on these reasons, the size accuracy is the variance or standard error of measurement, which is denoted by σ^2, while the information function, denoted by I, in order to get the formula as follows:

$$I = \frac{1}{\sigma^2}$$

In addition, function parameter information associated with the ability of participants (ability = θ) is estimated between -1 to +3, so the formula becomes a function of information:

$$I_i(\theta) = \frac{1}{\sigma^2}$$

This means that the item information function to detect test items in making estimates of ability (θ) at some points along the continuum θ. Also item information function is also associated with characteristic parameters of item that is discriminate item (a), the parameter level is difficult to item (b) and parameters in a way to guess the correct answer (c). Based on the parameters of these items we know the function of an information item parameters, item information function 2 parameters, and item information function of 3 parameters. This paper studies limit for item information function 2 parameters (a and b).

To calculate the value of information function of item 2 parameter (hereinafter referred to as the function of information) is determined by the following formula:

$$I_i(\theta) = a_i^2 P Q \theta\theta$$

$P_i(\theta) = 1/(1 + \text{EXP}(-a_i(\theta - b_i)))$.

$Q_i(\theta) = 1 - P_i(\theta)$.

$L = -a_i(\theta - b_i)$

Description:

ai = discriminate index i
θ = ability
Pi (θ) = Probability of correct answers
Qi (θ) = probability of wrong answers

Based on the formula indicates that the function of information depends on two characteristic parameters of item that is a and b. According to Hambleton information function will have high value when 1) the extent is difficult to point (b) approach capability (ability = θ), and the less if the woman away from the ability ¬ (θ), 2) the different items (a) high. The function of the information will reach a maximum value when θ = bj and D = 1.7 and can be calculated through the following formula

$$I_j(\theta) = 0{,}7225$$

To explain in greater detail will we see 6 items varying test information functions:

Table 2. Calculation of information items two-parameter model for

Six items different parameter values of a and b

No. item	Item Parameter		Values Item Information Function Based abilities						
	a	b	-3	-2	-1	0	1	2	3
1	2.0	1.0	0.02	0.07	0.29	0.97	1.63	0.97	0.29
2	1.0	1.0	0.05	0.13	0.30	0.57	0.72	0.57	0.30
3	1.7	2.0	0.00	0.01	0.05	0.26	1.09	2.09	1.09
4	1.2	1.7	0.01	0.05	0.15	0.42	0.88	1.01	0.60
5	2.0	2.5	0.00	0.00	0.01	0.08	0.52	2.27	2.27
6	2.0	-1.0	0.02	1.21	2.89	1.21	0.20	0.03	0.00

Based on Table 2 above shows that the higher the value of the parameter b the higher the value of this item information function look at point 5 of the value b = 2.5 the highest point of information function value lies in the ability of $\theta = 2$ for I = 2.27. It also can see the comparison between point 1 and point 2, which has the parameter values the same level of difficulty, namely b = 1 but different value of a. Theoretically, a value will influence the level of information functions, the higher the value of a the higher the value of information function. In addition we also can see from the two points is that the highest function value of information lies in the ability of the same parameter value b. For more details, the two points are illustrated through a curve which can be seen in Figure 2 below.

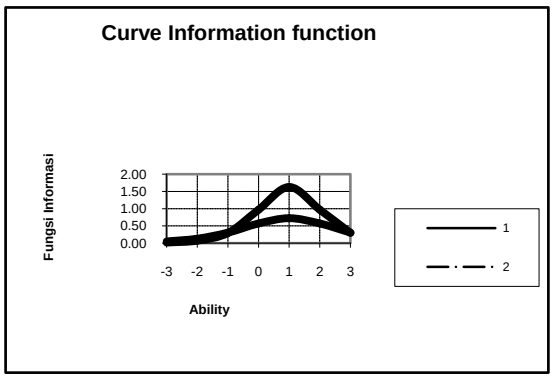

Figure 3: Comparison of curves 1 and 2 Item Information

Based on Figure 2 shows that item 1 has a higher information content of clause 2, it is because the value of the parameter a = 2 at point 1 is higher than the value of a = 1 in item 2. In addition, the

maximum value function item information on both these items have the same position when viewed on-line capability is the ability θ = 1.

Similarly, for items 3 and 4 based on the characteristic parameters of the second clause has the value of items a and b are different. Item 3 values of information functions must be higher than point 4, as item 3 has the value of a and b are higher than point 4. For more details, the two points are illustrated in the form of curves that can be seen in Figure 4 below.

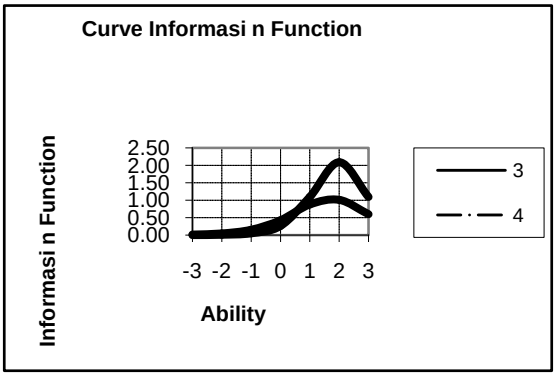

Figure 4: Comparison of curves 3 and 4 Item Information

Curve to points 5 and 6 visible contrast, this is due to item 5 has value parameter b (b = 2.5) high, while the parameter b in point 6 have low and negative (b =- 1), but both have information content high enough on the ability of different places

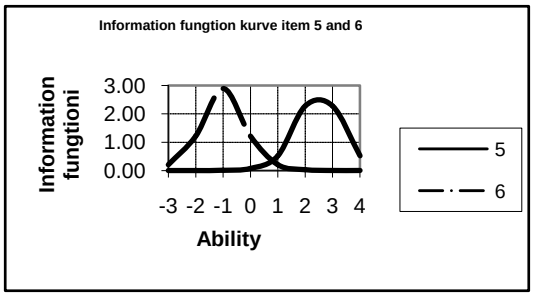

Figure 5: Comparison of curves 5 and 6 Item Information

Based on this theoretical study we can conclude that a test will have a content item information function of high value if tested to participants who have the ability to test the same or close. If a test item that has a level of difficulty (b) high for example b = 2 = 0 or below theθdiujikankan to test participants who have the ability test item did not work or worked only a few who can answer the test items correctly, so did the opposite . There are some things in the theory of information functions that can not be drawn in a linear manner for example a test item that has a

level of difficulty (b = 1) will yield the maximum information function value on = 1 but the function of information will decrease theθthe ability of = 2θlevel of ability on it (see table 2 item 1). This does not mean the test item can not be done by participants who have the ability to test higher.

In addition to item information functions we also know the test information function. Test information function is the sum of item information functions that exist in these tests. Form the test information functions used are usually tailored to the needs or objectives of the test. Suppose the goal is for the selection tests, for example, can be seen Figure 6, if we want to get the result of selection for the ability of between -1 to 3 then the appropriate constituent item are items that have item information function -1 and 0.1 for the ability of maximum information function is 1, 9 to 1.5 capability

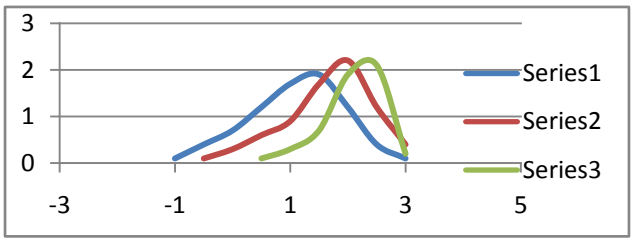

Figure 6: Test information function curve model

By using the information as reference material in assembling the test, it is expected that the resulting test will measure the ability of participants in accordance with the tests, so that the scores obtained reflect the true state of the test participants.

3. Conclusion

The conclusion that can be drawn from this paper is that: The function information is information that invariant test of each test item that can be used as a benchmark in choosing the test points to further assembled into a test is ready to be served. The advantage gained from this item information function is that we can arrange the items which will be selected in accordance with test participants ability. Value of item information function will not change if done by any group, so difficult and easy it will be perceived as a test between the group with one other group.

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GREEN JOBS : CHALLENGE FOR THE EDUCATIONAL INSTITUTION

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Abstrak

Dalam satu dekade terakhir, climate change, global warming, dan berbagai isu lingkungan telah menjadi isu yang hangat Berkembangnya isu lingkungan ini akhirnya memunculkan berbagai program, kebijakan dan teori yang terkait dengan pelestarian lingkungan. Green Jobs adalah suatu penamaan (labeling) yang dilakukan ILO (International Labor Organization) untuk pekerjaan-pekerjaan yang dapat dikategorikan sebagai pekerjaan pelestarian lingkungan. Penamaan ini dimaksudkan untuk meningkatkan kesadaran masyarakat, bahwa ada berbagai lapangan usaha yang secara bisnis menguntungkan dan secara lingkungan melestarikan. Makalah ini secara singkat membahas konsepsi green jobs serta implikasi berupa tantangan bagi institusi pendidikan.

Key words : environment, green jobs, green economy

Introduction

Climate change is the main environmental policy priority across the whole world and is often related to other environmental pressures and policy areas, for example water scarcity and energy. A significant amount of money has been dedicated to dealing with climate change and moving towards a lowcarbon economy through national stimulus packages adopted in response to economic crisis. The focus for green stimulus spending tends to be energy efficiency in buildings, renewable energy, low-carbon vehicles and sustainable transport.

A key issue for policy-makers and stakeholders dealing with climate change is how to reduce greenhouse gas emissions through energy efficiency and alternative forms of energy and transport. Mitigation technologies, policies and measures are designed at national, international and sector levels. They include mainly construction, agriculture, manufacturing and transport. Green technologies offer the possibility of new green jobs for those who respond quickly to the developing green economy. New green jobs will require new skills in new and emerging occupations.

Research shows that green investments, particularly in renewable energy and ecoconstruction, are potentially significant engines for job creation. A study recently commissioned by the UK government estimated that 400 000 gross jobs could be created by 2015 if plans to reduce greenhouse gas emissions were realised. In the US, money invested in energy efficiency and renewable energy is estimated to produce between two and a half and four times as many jobs as the same dollar invested in producing energy from oil.

The Concept of Green Jobs

The United Nations Environmental Program (UNEP) explains that green jobs are "those that contribute appreciably to maintaining or restoring environmental quality and avoiding future damage to the ecosystem." Green jobs can include highly sophisticated tasks such as researching the second generation biofuels as well as lower skilled jobs that includes the installation of micro - hydro turbines or solar panels.

Another definition asserts that green jobs (1)"involve some tasks associated with improving the environment, (2)"provide a sustainable family wage, health and retirement benefits, and decent working conditions" (3)"should be available to diverse workers across the spectrum of race, gender and ethnicity".

Green jobs hold the promise that humankind will be able to respond effectively and fairly to the following two defining challenges of the 21st century. First is averting dangerous and potentially unmanageable climate change and protecting the natural environment which supports life on earth. Environmental degradation, including the pollution of water, land and air, the irreversible loss of biodiversity, the deterioration and exhaustion of natural resources such as water, fertile agricultural land, and fish, is one of the most serious threats facing economic and broader sustainable development. The environmental and health costs already often outweigh the gains from the economic activity causing the damage. Such degradation will be exacerbated by the impacts of climate change, which are already felt in many developing countries. In the medium- to long-term, projected climate change will lead to the serious disruption of economic and social activity in many sectors worldwide. Scientific scenarios for avoiding dangerous and possibly unmanageable climate change require global emissions of green house gases to peak over the next 10-15 years and then to decline by half until the middle of the century. Stabilising the climate will require a rapid shift to a lowcarbon world economy.

The second challenge is providing decent work and thus the prospect of wellbeing and dignity for all. Decent work is defined as opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity. Decent work sums up the aspirations of people in their working lives: opportunity and income; rights, voice and recognition; family stability and personal development; for fairness and gender equality. Ultimately these various dimensions of decent work underpin peace in communities and society. Decent work is central to efforts to reduce poverty, and is a means for achieving equitable, inclusive and sustainable development. The social challenge of the working poor looms just as large: a staggering 1.3 billion people, over 40 % of the global workforce, and their dependants live in poverty and insecurity because their earnings are too low and they are relegated to the informal economy. There are 190 million unemployed and tens of millions of young job-seekers cannot find a place in society.

The above challenges are closely linked and need to be addressed together. Green jobs are crucial to meeting both simultaneously. Making economic growth and development compatible with stabilising the climate and with a sustainable environmental footprint will require a drastic shift towards clean development and green, low-carbon economies worldwide. The green jobs and the decent work agendas are mutually supportive and include several interdependent elements, such as rights at work, more and better jobs for women and men, social protection measures, labour

protection – in terms of occupational safety and health, migration, laws on wages and working time – and social dialogue, including freedom of association and collective bargaining.

Green jobs reduce the environmental impact of enterprises and economic sectors, ultimately to sustainable levels. Green jobs are found in many sectors of the economy from energy supply to recycling and from agriculture and construction to transportation. They help to cut energy, raw materials and water consumption through high-efficiency strategies, to decarbonise the economy and reduce greenhouse-gas emissions, to minimise or avoid altogether all forms of waste and pollution, to protect and restore ecosystems and biodiversity.

Green jobs do not automatically constitute decent work. Many current recycling jobs, for instance, recover raw material and thus help to alleviate pressure on natural resources, but apply a process which is often dirty, dangerous and difficult, causing significant damage to the environment and to human health. Employment in this industry in developing countries tends to be precarious and incomes are low. If green jobs are to be a bridge to a truly sustainable future, then they also must be decent jobs. Decent, green jobs effectively link Millennium development goal 1 (poverty reduction) and Millennium development goal 7 (protecting the environment) and make them mutually supportive rather than conflicting.

Skills shortages have emerged as a constraint on the greening of economies in industrial and developing countries alike. This is why developing the right skills to ease just transitions is a crucial element in the process. In response to the urgency for greener economies, young persons and workers with the right skills and the ability to learn new ones will be prepared to shift out of declining and into emerging industries.

High Potential Sectors for Green Jobs

The green jobs report has identified the sectors which are particularly rich in potential for green jobs. The criteria applied were greenhouse-gas emission, use of raw material, substantial contribution to the economy and sources of employment and income:

(a) energy supply, in particular renewable energy, where more than 2.3 million green jobs have been created in recent years. However, renewable energy sources supply only 2 % of the world's energy. The wind power industry employs some 300 000 people, the solar photovoltaic sector an estimated 170 000 and the solar thermal industry more than 600 000, a large proportion of these in China. Countries with active policies to promote renewable energy have seen employment surge in this sector;

(b) energy efficiency, particularly in building and construction, which is one of the areas with the highest potential to reduce greenhouse-gas emissions and to create jobs in the process. Some four million direct green jobs, based on improving energy efficiency, already exist across the economy in the US and certain European countries;

(c) transportation is the lifeblood of the globalised economy. While efforts are being made to reduce the footprint of cars, public transport offers lower emissions and more green jobs. Railways can generally be regarded as sources of green employment;

(d) basic industry and recycling sectors such as iron and steel, aluminium, cement, pulp and paper account for a large proportion of the use of energy and raw materials, as well as of greenhouse-gas emissions, but a relatively small proportion of global employment. The best option for

reducing the environmental impact of these industries is through recycling. Secondary steel production, based on recycled scrap, requires 40-75 % less energy than primary production and can, therefore, be seen as a proxy for greener production. Recycling in all its forms provides 12 million jobs in the three countries for which data is available (Brazil, China, and the US). However, many existing recycling jobs cannot be considered green because they cause both pollution and health hazards and are not examples of decent work;

(e) agriculture is still the single largest employer in the world, with 1.3 billion farmers and agricultural workers in total. Agriculture is both extremely vulnerable to climate change and a major contributor to it. It is also a major user and polluter of water, a driver of deforestation and of loss of biodiversity. Small farms are more labour-intensive. With adequate technical and infrastructure support, yields from small farms using crop rotation, manuring, natural pesticides, and other sustainable methods can match larger but often more environmentally damaging facilities.

Closing the Skills Gap to Green Economies

There are common principles for meeting skills needs for all sectors with high growth potential for green jobs. An emphasis on high-end skills would be misplaced. Engineers, designers, and researchers are needed to develop new technologies and more sustainable work processes. Applying green technologies, however, requires technicians to install, repair and maintain them. These jobs are often referred to as 'green collar' jobs. Apart from technical know-how, a whole range of business and social skills are critical to shift economies to more and better green jobs :

(a) entrepreneurial skills to seize the opportunities of low-carbon technologies;
(b) management skills to make sure that processes respond to adaptation and mitigation challenges;
(c) core skills such as ability to learn and to innovate;
(d) leadership skills for policy-makers to be able to set the right incentives and create enabling conditions for cleaner production, cleaner transportation and so forth.

Skills Paradigm

The skills associated with the emerging green economy can be categorised into generic skills and specific skills. The latter group are particularly relevant for the green economy, which creates a new skills paradigm that, in general, is more holistic in approach than the traditional one. The new paradigm places greater emphasis on design and working in multidisciplinary teams with a high degree of autonomy and responsibility. Projects often entail bringing together professionals from widely diverse backgrounds such as engineers, planners and architects with ecologists and archaeologists. This means that generic skills such as strategic leadership and adaptability will be important in the green economy. Good knowledge of the sciences, including engineering, environmental and biological, is a general feature of many of the skill sets required by the emerging green economy.

It is generally agreed that the specific skills associated with the merging green economy are not entirely new skills; they are either an add-on or an amalgamation of existing skills. An example of add-on skills are the competences required in installing sustainable biomass heating technologies

(wood pellets or wood chip boilers) technologies such as solar tubes and panels, photo-voltaic tiles or geothermal heating systems. In these cases, some knowledge of plumbing is required; similarly solar tube and panel technologies require fitting or electrical skills. Good diagnostic skills will also be in demand in the emerging green economy, with the ability to measure the carbon footprint an important competence. The rising cost of energy, combined with greater awareness of environmental issues and legislation such as the European building performance energy directive, will create strong demand for energy assessors.

Greening of Occupations and Skills

All occupations will need 'greening' with a spectrum from those new jobs focused solely on the delivery of green goods or services to those that will require more limited changes to improve energy efficiency and reduce resource use. There will be a need to develop the skills base for each mitigation technology, whether in terms of renewable energy generation or energy/resource efficiency. There will be demand not only for technological expertise but also communication skills to provide advice on new technologies to both businesses and consumers. It will be vital to cascade information to a wide range of professionals, such as planners, architects, builders, and plumbers. Broader provision of advice on carbon auditing and low-carbon technologies for both business and individuals is likely to become an increasingly important sector. Professionals, such as carbon auditors, could be crucial to the delivery of emission reductions and achieving greenhouse gas targets but, given their relatively small numbers within green jobs as a whole, there is the danger that their skills needs may be overlooked.

Challenge for the Educational Institution

It is important that a revised curriculum, particularly in terms of science and technology, provides the necessary knowledge of mitigation technologies. However, this will only be applicable to students. Both professionals and blue-collar workers will need retraining with relevant green skills. All lifelong learning programmes should provide appropriate skills updates to ease the transition to low-carbon business. The provision of both specific technological skills and generic training related to carbon auditing and management are equally important.

Education and training systems will be better able rapidly to develop green skills requirements if there is improved social dialogue between those developing education systems and training standards and both employers and trade unions. The education system should promote multidisciplinary learning environments and, together with the social partners, should be encouraged to take a broader view of how competences are defined and acquired. In particular, national qualifications frameworks should aid both vertical and horizontal career progression; the need for more holistic skills entails a requirement for a flexible qualifications system that supports and encourages the continuous acquisition of additional competences. Such a framework should include the recognition of informal learning mechanisms, accreditation of prior learning, and the increasing scope for 'train the trainer' programmes; it should also include both the opportunity and support for more quality

internships. A closer working relationship needs to be developed between the needs of industry and formal education and training.

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THE INFLUENCE OF COMMUNICATION PROMOTION, SERVICE QUALITY, TOWARD BRAND IMAGE UNIVERCITY

Dewi Suliyanthini.[34]

Abstract

The objectives of this research were to find out: (1) the effect of communication promotion on brand image University , (2) the effect of service quality on, brand image University (3) the effect of communication promotion on service quality. The study was a survey conducted in student University State of Jakarta with 383 sample, proportional random sampling. The data were analyzed by using path analysis.

The research finding are as follows: (1) there was a positive effect of communication promotion on brand image University; (2) there was a positive effect of service quality on brand image university; (3) there was a positive effect of communication promotion on service quality. The result of this research suggested that in order to build enhance brand image at the univercity, communication promotion, and service quality, should be considered seriously.

***Key word** : Communication Promotion, Service quality, and brand image*

INTRODUCTION

Communication can be defined as transmitting, receiving and processing information. Communication to transfer an idea or massage, occurs when the receiver is able to comprehend the information.

The communication process is part of any marketing program, the senders are companies that manufacture, econding the message is the second step. And transmission devices, the third stage of the marketing communication process occurs when a channel or medium delivers the message. Deconding occurs when the message reaches one or more of the receiver's senses. The final component of the communication process is feedback. Its feedback are brand image. It takes the form of purchaces, inquiries, complaints, questions, visits to the store, blogs and web site hits. Implication communication promotion have consequence the brand image. This brand image are univercity, most be about service quality process and communication promotions program in univercity.

Technology changes and improvements are particularly helpful in closing this gap, as the technology, application knowledge, and skill. Because services are intangible, they are difficult to describe and communicate. This difficulty becomes especially evident when new services are being

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developed. It is critical that all people involved, be working with the same concepts of the new service, based on customers needs and expectations. For a service that already exists, any attempt to improve it will also suffer unless everyone has the same vision of the service and associated university issues. One of the most important ways to avoid provider gap is to clearly design services without oversimplification, incompletenss, subjectivity and bias.

Perhaps the most distinctive skill of professional lectures are their ability to build and manage brands. A brand is a name, term, sign, symbol or design, or a combination of these, that identifies of a product curriculum services in univercity. Let's explore the gaps in more detail: the knowledge gap, the policy gap, the delivery gap, the communications gap, the perceptions gap, and the service quality gap. This research is the different between what customers expect.

This research, had been looking for influence communication promotion toward brand image university, and service quality toward brand image university.

THEORY

Communication Promotion

Julia T Wood, in textbook Communication Theories in Action, (2004; 9) "Communication as a systemic process in which individuals interact with and throught symbols to create interpret meaning. Communication is also systemic which means that it involves a group of interrelated parts that one another. The third key idea in our definition is the use of symbols which are abstract arbitrar representation of other thing.

Textbook from Shimp Terrence in Advertising Promotion, Marketting and Communication. (1990;424), "Promotion is marketers effort to communication with target audience. Communication is the process of influencing others behavior by sharing ideas, information of feeling with them.

Theory communication was John Burnet and Sandra Moriarty, in textbook Introduction to Marketing Communication, (1996; 6), there are; Promotion as the marketing function concerned with persuasively communication to target audiences the components of the marketing program in order to facilitate exchange between the marketer and the consumer and to help satisfy the objectives of both.

Phillip Kotler and Gary Amstrong, in textbook Principles of Marketing, (2010;426), "A Company's total promotion mix also called its marketing communication mix – consists of the specific blend of advertising, public relation, personal selling, sales promotion and direct marketing tools that the company uses to persuasively communicate customer value and build customer relationships.

Theory from Kenneth E. Clow and Donald Baack, in textbook Integrated advertising, Promotion and Marketing Communication, (2010;32), there were, "Communication can be defined as transmitting, receiving and processing information. When a person, group or organization attempts to transfer an idea or message, communication accurs when the receiver (another person or group) is able to comprehend the information.

Textbook Marketing Management, from Phillip Kotler and Kevin L Keller, (2009; 512), "Company communication goes beyond those specific platforms. The product's styling and price, the shape and color of the package, the salesperson's manner and dress, the store décor, the company's stationery - all communicate something to buyers. Every brand contact delivers and impression that can strengthen or weaken a customer's view company.

Valarie A Zeithaml, Mary Jo Bitner and Dwayne D Gremler, in textbook Service Marketing (2009;481), "Integrated marketing communication (IMC) build a strong brand identity in the marketplace by tying together and reinforcing all your images and message. IMC means that all yor corporate messages, positioning and images and identity are coordinated across all venues. It means that your public relations materials say the same things as your direct mail campaign and your advertising has the same look and feel as your website.

Theory Leon G Schiffman and Leslie Lazar Kanuk, in textbook Consumer Behavior, (2010;280) are there, "Communication is the transmission of massage from a sender to a receiver via a medium (or channel) of transmission. In addition to these four basic components-sender, receiver, medium and message- the fifth essential component of communication is feedback, which alerts the sender as to whether the intended message was, in fact, received. Messages are encoded by the sender and the decoded by the receiver.

Service Quality

Theory service quality from Valarie A Zeithaml, Mary Jo Bitner and Dwayne D. Gemler, in textbook Service Marketing (2009;37). The quality of services delivered by customer contact personnel is critically influenced by the standards against they are evaluated and compensated. Standards signal to contact personnel what management priorities are and which types of performance really count. When service standards are absent or when the standards in place do not reflect customers expectations, quality of service as perceived by customers is like to surfer. When standards do reflect what customers expect perceptions of the quality of service they receive are likely to be enhanced, service quality of physical evidence, and the servicescape to meet customer expectations.

Cristopher Lovelock and Jochen Wirzt, in textbook Service Marketing, People, Technology and Strategy (2009:406). In subsequent research, they found a high degree of correlation between several of these variables and so consolidated them into five broad dimensions: a. Tangibles (appearance of physical elements); b. Reliability (dependable and accurate performance); c. Responsiveness (promptness and helpfulness); d. Assurance (credibility, security, competence and courtesy); e. Emphathy (easy acces, good communications, an customer understanding).

Valarie A Zeithaml, Mary Jo Bitner and Dwayne D. Gremler, in textbook Services Marketing (2009;111), "the five dimensions defined here are shown of service quality with the scale developed to measure them, SERQUAL: a. Reliability (ability to perform the promised service dependably and accurately); b. Responsiveness (willingness to help customers and provide prompt service); c. Assurance (employees' knowledge and courtesy and their ability to inspire trust and confidence); d.

Empathy (caring, individualized attention given to customers); e. Tangibles (appearance of physical facilities, equipment, personnel, and written materials).

Then Valarie etc, in textbook, about E-Service Quality (E-S-Qual). The four core dimensions that customers use judge website at which they experience no questions or problems are as follows: a. Efficiency (the ease and speed of accessing and using the site); b. Fulfillment (the extent to which the site's promises about order delivery and item availability are fulfilled); c. System availability (the correct technical functioning of the site), d. Privacy (the degree to which the site is safe and protects customer information), e. Responsiveness (the effective handling of problems and returns through the site); f. Compensation (The degree to which the site compensates customers for problems); g. Contact (the availability of assistance through telephone or online representatives).

Phillip Kotler and Kevin L. Keller, in textbook Marketing Management, (2009:402); "Based on this service quality model, researchers indetified the following five determinants of service quality, in order of importance: 1. Reliability (the ability to perform the promised service dependably and accurately); 2. Responsiveness (the willingness to help customers and to provide prompt service); 3. Assurance (the knowledge and courtesy of employees and their ability to convey trust and confidence); 4. Empathy (the provision of caring, individualized attention to customers); 5. Tangibles (the appearance of physical facilities, equipment, personnel and communication materials).

Brand Image.

Phillip Kotler, in Textbook Marketing Management, (2003:326), "Identity and image need to be distinguished. Identity comprises the ways that a company aims to identity or position it self or its product. Image is the way the public perceived the company or its products. Image is affected by many factors beyond the company's control. Identity have symbols, colors, slogan,, special attributes.

In textbook "Consumer Behavior", Leon G. Shiffman and Leslie L. Kanuk, (2010;163), "Consumers have a variety of enduring images of themselves.. these self image or perceptions of self, are very closely associatd with personality in that individuals tend to buy products and services and patronize retailers whose images or personalities relate in some meaningful way choices.

Theory Valarie Zaithaml, Mary Jo and Dwayne D. Gremler, in textbook Service Marketing (2009;68), "The degree to which consumers are committed to particular brands of goods or services depends on a number of factors: the cost of changing brands (switching cost), the availability of substitutes, social ties to the company, the perceived risk associated with the purchase, nd the satisfaction obtained in the past.

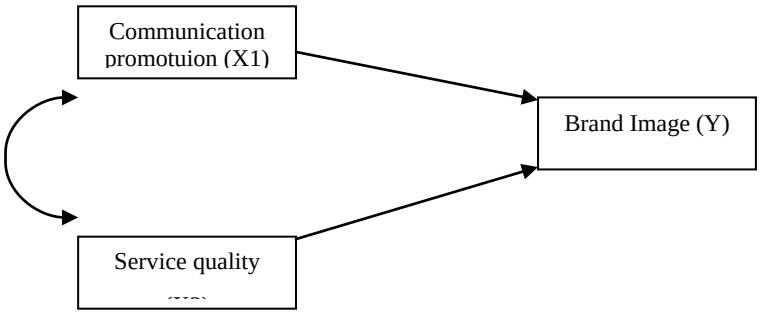
Kenneth E. Clow and Donald Baack, in textbook Integrated Advertising, Promotion and Marketing Communication, (2010;49); "One of the most critical ingredients in the successful development of an integrated marketing communications plan is effective management of an organization's image. A firm's image is based on the feeling consumers and businesses have about the overall organization and its individual brands.

And than Phillip Kotler and and Kevin Keller, in The American Marketing Association; "Brand as a name, term, sign, symbol or a design, or a combination of them, intended to identify the goods or services of one seller or group of sellers and to differentiate them from those of competitors. A brand is thus a product or service whose dimensions differentiate it in some way from other products or services designed to product performance of the brand.

Theory Phillip Kotler and Gary Amstrong, in textbook Principle of Marketing (2010;260), "Brand equity is the differential effect that knowing the brand name has on customer response to the product and its marketing it's a measure of the brand's ability to capture consumer preference and loyalty.

METODOLOGY.

This Research causal survey category, with path analysis technique toward variable communication promotion, service quality and brand image, for population 8950 student and 383 sample. Research design :



Analysis technique data with description and inferential analysis. Research hypothesis : $H_o : x \leq 0$ and $H_1 : y > 0$.

DISCUSSION

Descriptions Data eksogenus variable: X1; Communication promotion, X2; Service quality and endogenus variable Y; Brand Image.

Table Description Variable Research Data

Count	Variable		
	X_1	X_2	Y
Responden	383	383	383
Rentang	47	80	56
Maks skor	105	164	124

Min skor	58	84	68
Interval	5	10	7
Mean	75,21	116,8	91,19
Median	79	125	98
Modus	79	125	98
S	7,279	16,98	8,265

Table Resume Normality test

Variabel	**N**	**T_{table}**	**T_{test}**	**Resume**
X_1	383	0,1687	0.0562	Normal
X_2	383	0,1696	0.0518	Normal
Y	383	0,1437	0.0719	Normal

Table Resume Normality Galat Test

Regresion Models	**F_{test}**	**F_{table} (0,05)**	**Resume**
Y at X_1 $\hat{Y}=35,46 + 0,32X_1$	*59, 57* *0,6 76*	3,87 1,86	Liniar line Significant Regresion Coefficient
Y at X_2 $\hat{Y}= 36,01 + 0,189X_2$	56,587 0,56	3,87 1,86	*Liniar line Significant Regresion Coefficient*

Table Resume Correlation Variable

RESUME ANALYSIS COEFFICIENT CORELATION AND SIGNIFICANS				
t_{table} = 1.96 (0.05)	MATRIK	**COEFFICIENT CORELATION**		
		X_1	X_2	Y
COEFFICIENT	X_1	1	0.32	0.39

Cofficient $T_{table(0,01)}$ = 2,58

T_{test}	X_2	0.32	1	0.59
	Y	0.384	0.568	1

Coeffitcent corelation have signifikans if : $t_{test} > t_{table}$

The Influence Communication promotion (X1) toward Brand Image (Y) had 0,224. corfficient value T_{test} had 5,204 and T_{table} □ 0,05 = 1,96. this research have been the influence positive communications promotion toward brand image university, because T_{test} (5,204) > T_{table} (1,96).

Cunsumers have a variety of enduring images of themselves. These self-image, or perceptions of self, are very closely associated with personality in that individuals tend to buy products and services and patronize retailers whose image or personalities relate in some meaningful way to their own self images.

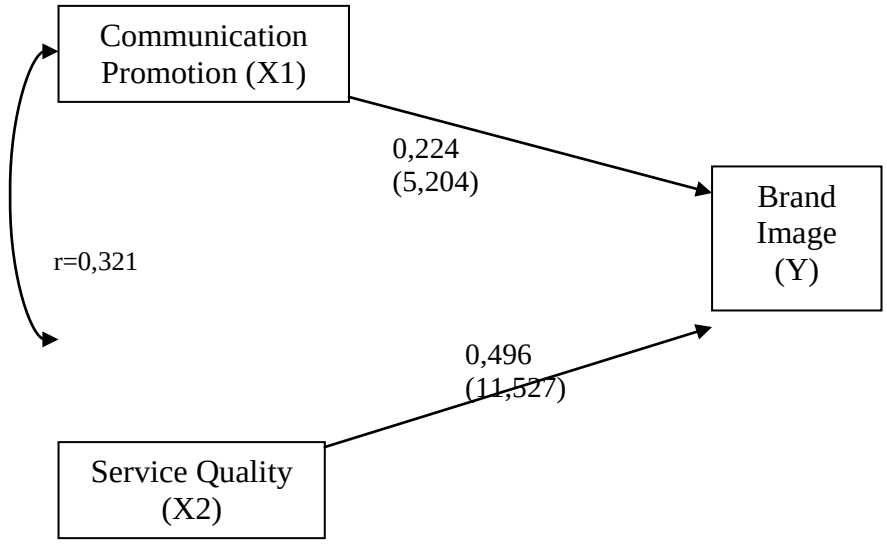
The influence service quality (X2) toward brand image (Y) have been value 0,496, with coefficient value T_{test} 11,527 and T_{table} □ 0,05 = 1,96, and than resume this research, have been the influence positive service quality toward brand image university, because T_{test} (11,527) > T_{table} (1,96).

Satisfaction will also depend on product and service quality. Quality is totality of feature and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

Table Resume Coefficient path analysis.

way	Koef value	T_{test}	t_{table}		R^2	€
			0.05	0.01		
X1 – Y	0,224	5,204	1,96	2,58	0,368	0,632
X2 - Y	0,496	11,527	1,96	2,58	0,368	0,632

Structural Variables Research Model



The quality of service delivered by customer contact personnel is critically influenced by the standars against which they are evaluated and compensated. Standards signal to contact personnel what management priorities are and which types of performance really count.

Technology changes and improvements are particularly helpful in closing this gap, as the technology describes. Because services are intangible, they are difficult to describe and communicate. This difficulty becomes especially evident when new services are being developed. It is critical that all people involved (top management/rector, manager/dekan, lectures, frontline employess, behind the scebes and support staff) be working with the same concepts of the new service, based on customers needs and expectations.

For a service that already exists, any attempt to improve it will also suffer unless everyone has the same vision of the service an associated issues.

Univercity State of Jakarta, had been maked lecture's issues strategy and exists in system delivery services lecture. Cause more than product curriculum university State of Jakarta, with slogan Entrepreneur in issues lecture Building Future, and it is looking for customers highstudent.

RESUME

The influence possitive Communication Promotion toward Brand Image University State of Jakarta.

and The influence possitive Service Quality toward Brand Image University state of Jakarta.

The influence positive communication promotion and service quality in university.

The issues strategy University State of Jakarta had been entrepreneur lecture building future.

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FRAME OF UNDERGRADUATE THESIS EXPERT EXAMINER PREDICTION AT DEPARTMENT OF ELECRTRICAL ENGINEERING USING NAIVE BAYES ALGORTIHM

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abstract

To assign a lecturer as an expert examiner of undergraduate thesis should be easy, but it becomes a bit difficult problem when the amount of the lecturers and the students increase. This could be categorized into classification problems in data mining. Many algorithms in classification were developed to deal with this problem. This paper try to analyse this matter using naive bayes algorithm by some input attributes to yield the target attribute. Naive bayes algorithm is used because of its simplicity of computing. The result of this analysis is a frame as a base to calculate, classify and assign lecturer as an expert examiner of undergraduate thesis.

Keywords: data mining, classification, naive bayes, target attribute.

1. Introduction

One of the exiting new developments in the field of data mining is algorithms that can predict accurately a class from given attributes. Many algorithmshave developed to to handle classification problems. Algorithms that have its abilities such as ID3, C4.5, Naive Bayes, SVM, and many others.Task of this kinds in data mining include into classification task.The accuracy of data mining algorithms to predict has been implemented in many applications.

Naive Bayes is an algorithm using bayes probability theory to predict class label. This algorithm is a good classification algorithm that each item in test data will be tested one by one and yield good accuracy. It is different from other algotithms like ID3 and C4.5 that build classifier model. The classifier model is formed as a rule. That is why ID3 and C4.5 known as rule-based classification. The classifier model becomes common rule to predict the class label of test data. In this paper, Naive Bayes algorithms will be used to predict the candidate of expert examiner of undergraduate thesis at Department Electrical Engineering, Universitas Negeri Jakarta.

The algorithm will be conducted as:

a. Gather the early data to calculate the prior and posterior probability. This data known as Train Data. The probabilities point become the frame of probability.
b. Take the test data, the data that does not have class label, then calculate the data using frame of probability that obtained in the previous step.

c. Compare the result of probabilty in each class label, then the highest one is the class label prediction.

2. Structure of Undergraduate Thesis Supervisor and Expert Examiner

Supervisor of undergraduate thesis at Department of Electrical Engineering universitas Negeri Jakarta consists of two lecturers. One is assigned as material supervisor and another one is assign as methodology supervisor.The material supervisor usually becomes the 1st supervisor and methodology supervisor becomes the 2nd supervisor, respectively. But, in real supervising it could be overlapped, even a supervisor could be a material and methodology supervisor.

Generally, the supervisors at department of eelectrical engineering:

a) Material Supervisor, that supervise students in the core topics of his/her thesis.
b) Methodology Supervisor, that supervise students in methodology.

The qualifications of material supervisor should be:

a) Education background
b) Research has been conducted
c) History of supervied student topics
d) Subject courses that he/her tought

Lecturers at Department of Electrical Engineering is grouped into some Science Field Group. There are Education Science Field Group, Telecommunication Science Field Group, Computer and Digital Systems Science Field Group, Control Systems Science Field Group, and Electricity Science Field Group, respectively.

The examiners for undergraduate thesis consists of three lecturers. One as a Chairman of Examiner, who could be the Head of Department or the Head of Study Program, one as a Secretary who could be taken randomly, and one as an expert examiner who should be a lecturer has abilities in the field of thesis topics the students taken. The expert examiner should have high credibility to examine the students, he/she must have education background and research related to the student's thesis. Sometimes, the expert could not attend to the examination, with the sudden notification. Hence, the department replace the expert examiner randomly. This should not be happened since the replaced examiner could be lecturer who has no credibilities in the field to be examined.By using this frame of probability, we can reduce the bigger mistakes to assign lecturers as an expert examiners. The frame of undergraduate thesis examiner will be base of conducting test to some data to assign the class label.

To simplify the topics of thesis at electrical engineering department, although the department has four science field groups, we will group the class label into six groups:

1. Telecommunication
2. Digital Systems
3. Computer
4. Control Systems

5. Electricity
6. Education

The thesis topics could cover one or two science field.Hence, the variable of topics will be divided into two, topic 1 and topic 2. However, a thesis could cover only one topic, in this case topic 1 and topic 2 will be filled same value.

3. Naive Bayes Algorithm

Classification is a task that occurs very frequently in everyday life. Essentially it involves dividing up objects so that each is assigned one of a number of mutually exhaustive and exclussive categories known as classes. The term exhaustive and exclussive simply means that each object must be assigned to precisely one class.

Naive Bayes is classification algorithm in data mining using probability theory form Bayes to find class label. Algoritma This algorithm is not rule-based classification algorithms, since the data will be calculated straightly to find the class label. It is different from ID3 and C4.5 that yield the rule to classify the test data. The rule will be implemented to obtain the class label. It is why ID3 and C4.5 known as rule-based classification.

The Bayes Theorem is a basic principle in statistics to combine prior knowledge with new knowledge that get from the data.This probabilitycould be estimated as below:

$$P(H|X) = \frac{P(X|H)\,P(H)}{P(X)}$$

P(H) is prior probability of H, *P(X)*is prior probability of X, while *P(H|X)*is posterior probability of X conditioned on H.

4. Frame of Prediction

a) Variables/Attribute

The first step to build classifier frame is to determine explanatory attribute. Explanatory attribute is similar to independent variable. The independent variables are used to be input variables that will be calculated into the frame. Hence, the variables are:

1. Topic 1
2. Topic 2
3. Material Supervisor, simply called supervisor
4. Day (of exam)
5. room

While the target attribute or dependent variable is the examiner. This attribute is called class label.

b) Frame

Tabel 1: Train data thesis examiners

No	Name	Topic 1	Topic 2	Supervisor	Examiner	Day	Room
1	Syarif Hidayat	Computer	Computer	Yuliatri	Ajie	Tues	403
2	Rio Hardy Tamara	Control	Digital Systems	Purwanto	Prasetyo	Wed	402
3	Rony	Education	Digital Systems	Mufti M	Yuliatri	Fri	403
4	Djati Tri Lestari	Computer	Education	Ivan H	Ajie	Fri	403
5	M. Fahmi Addeimy	Telcom	Telcom	Baso M	M. Ficky	Fri	402
6	Karseno	Education	Computer	Bambang DP	Ajie	Thurs	402
7	SanggaWisesa G	Control	Digital Systems	Wisnu	Aodah	Sun	403
8	Arif Prasetya Tarmuji	Electricity	Electricity	Massus	Irzan	Tues	403
9	Banu Salman A	Education	Digital Systems	Syufrijal	Jusuf Bintoro	Thurs	402
10	Ermawan Sulistyo	Education	Computer	Bambang DP	Yuliatri	Thurs	403
11	Richard Amri	Education	Electricity	Bambang DP	Irzan	Fri	402
12	Tika Setiawati	Education	Computer	Sukardjo	Yuliatri	Fri	403
13	Moch. Fauzi N	Digital Systems	Computer	Pitoyo Y	Aodah	Sun	403
14	Muhammad Aris	Digital Systems	Computer	Pitoyo Y	Jusuf Bintoro	Sun	402
15	Jauzan Arif B	Education	Electricity	Soeprijanto	Purwanto	Thurs	402
16	Firdaus	Education	Electricity	Sri Suyanti	Purwanto	Thurs	403
17	Imam Arif R	Education	Computer	Bambang DP	Yuliatri	Sun	403
18	Sakirah	Education	Electricity	Massus S	Irzan	Fri	403

19	Rozi Ramadhani	Education	Control	Sri Suyanti	Aodah	Thurs	402
20	Priya Fahrizqon Ageng	Control	Electricity	Readysal	Irzan	Thurs	402

From table 1 shown above, the target attribute is examiner with grey scaled. For the train data we can tabulate all the conditional and prior probability as shown in table 2:

Table 2: Frame of probability obtained

	Class=Yuliatri	Class=Prasetyo	Class=Ajie	Class=M.Ficky	Class=Aodah	Class=Irzan	Class=Jusuf	Class=Purwanto
Topic1=Comp	0	0	0.67	0	0	0	0	0
Topic1=Control	0	1	0	0	0.33	0.25	0	0
Topic1=Edu	1	0	0.33	0	0.33	0.5	0.5	1
Topic1=Telcom	0	0	0	1	0	0	0	0
Topic1=SD	0	0	0	0	0.33	0	0.5	0
Topic1=Elect	0	0	0	0	0	0.25	0	0
Topic2=Comp	0.75	0	0.67	0	0.33	0	0.5	0
Topic2=Control	0	0	0	1	0.33	0	0	0
Topic2=Edu	0	0	0.33	0	0	0	0	0
Topic2=Telcom	0	0	0	0	0	0	0	0
Topic2=SD	0.25	1	0	0	0.33	0	0.5	0
Topic2=Elect	0	0	0	0	0	1	0	1
Spv=Yuliatri	0	0	0.5	0	0	0	0	0
Spv=Purwanto	0	1	0	0	0	0	0	0

Spv=Ivan	0	0	0.5	0	0	0	0	0
Spv=Mufti	0.25	0	0	0	0	0	0	0
Spv=Baso	0	0	0	1	0	0	0	0
Spv=Bambang	0.25	0	0	0	0	0.25	0	0
Spv=Wisnu	0	0	0	0	0.33	0	0	0
Pemb=Massus	0	0	0	0	0	0.5	0	0
Spv=Syufrijal	0	0	0	0	0	0	0.5	0
Spv=Sukarjo	0.5	0	0	0	0	0	0	0
Spv=Pitoyo	0	0	0	0	0.33	0	0.5	0
Spv=Soepri	0	0	0	0	0	0	0	0.5
Spv=Sri S	0	0	0	0	0.33	0	0	0.5
Spv=Readysal	0	0	0	0	0	0.25	0	0
Day=Sunday	0.25	0	0	0	0.67	0	0.5	0
Day=Tuesday	0	0	0.33	0	0	0.25	0	1
Day=Wed	0	1	0	0	0	0	0	0
Day=Thursday	0.25	0	0.33	0	0.33	0.25	0.5	0
Day=Friday	0.5	0	0.33	1	0	0.50	0	0

Room=403	1	0	0.67	0	0.67	0.5	0	0.5
Room=402	0	1	0.33	1	0.33	0.5	1	0.5
Prior Probability	0.20	0.05	0.15	0.05	0.15	0.20	0.10	0.10

5. Analysis

From table 2 above, we can predict an expert examiner if the exlanatory attributes are known. Given a student X have an undergraduate thesis topic 1 is about education and topic 2 is about computer, supervisor is Sukarjo, exam day is Thursday, room is 403, then simply we can calculate the prediction using the frame:

X

Education	Computer	Sukarjo	Thursday	403

Class=Yuliatri
0.2 X 1 X 0.75 X 0.5 X 0.25 X 1 = 0.01875

Class=Prasetyo
0.05 X 0 X 0 X 0 X 0 X 0 = 0

Class=Ajie
0.15 X 0.33 X 0.67 X 0 X 0.33 X 0.67 = 0

Class=M. Ficky
0.05 X 0 X 0 X 0 X 0 X 0 = 0

Class=Aodah
0.15 X 0.33 X 0.33 X 0 X 0.33 X 0.67 = 0

Class=Irzan
0.20 X 0.50 X 0 X 0 X 0.25 X 0.5 = 0

Class=Jusuf Bintoro
0.10 X 0.50 X 0.50 X 0 X 0.5 X 0 = 0

Class=Purwanto
0.10 X 1 X 0 X 0 X 0 X 0.5 = 0

From the calculation above we can conclude that the highest probability to become an expert examiner of student X exam is Yuliatri. This calculations show that other lecturers have probability 0, while Yuliatri has 0.01875. Using the same way we can predict other students who will conduct their thesis exams.

Actually, from the accuracy, Naive Bayes algorithm is better than ID3 since each item data in test data will be calculated to predict,while ID3 forms general rules, that the rules will be implemented into test data.However, if the probability value is 0, then the acuracy could be decrease.

6. Conclussion

Naive Bayes algorithm is a good algorithm to do classification assignment. Compare with ID3, this algorithm will calculate each test data item one by one, while ID3 build a classifier model as general rules. It is simple to calculate using Naive Bayes since this algorithm adopts the probability theorem of Bayes.

$$P(H|X) = \frac{P(X|H)\,P(H)}{P(X)}$$

The result of this small research is not finished yet, but the frame is fine to use as a frame to predict expert examiner. The accuracy of this frame will be more accurate, if the amount of the train data is more. The more data is available the accuracy of prediction is better.

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WRITING FOR PUBLICATION: GATEWAY TO A GLOBAL LEARNING COMMUNITY

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Abstract

In academic world, publication output is an indicator of prestige and performance. Besides, the publication processes offer many more benefits to authors. With publication, other experts can review an author's work and give a valuable feedback that enforces the author to learn more. Moreover, a network of people who are interested in the same field of study or who are working in the same area can be established. In other words, publication is a gateway to a global learning community. In this paper, the basic skills needed for scientific writing are presented together with a guidance to publish in reputed international journals that can support us to join a global learning community.

Keywords : writing, publication, learning community

Introduction

Writing for publication is an activity that can be both rewarding and frightening for an academic staff[1]. There are many advantages of writing for publication can be achieved. Such advantages include the following[2] :

- On a personal level, publishing in a reputed journal increases author's professional credit, career opportunities, and development.
- It may attract research income to the faculty.
- Knowledge of an author can be useful to other people in other organizations or even in other countries.
- Others can review the author's work and give a useful feedback for improvement.
- A global learning community of people interested in the same area of study can be established.

Writing, however, is not an easy task for a new author. There are many barriers to publishing a paper in a reputed journals. Such barriers include the following [1, 3]:

- People who learn English as second language face a language problem.
- Many people think they don't have enough time to write.
- There is a lack of experienced authors who support and guide new authors.
- Uncertainty about the review process.

All of the barriers are actually can be solved. For example, people who have limited English skill may use a professional translator, and time limitation can be managed with a good time management strategies.

This paper will be focused on the basic skills needed for scientific writing and the explanation on review process of a reputed international journal.

The Basics of Scientific Writing

In this part, the basic elements of scientific writing are described, involving structure of a scientific paper, suggested writing order, and the skill of writing paragraphs.

Structure of A Scientific Paper[4]

Scientific writing follows a rigid structure. The format has been developed over hundreds of years. Table 1 shows the components of a scientific paper.

Table 1. Components of a Scientific Paper[4]

Section	Purpose
Title	Clearly describes contents
Authors	Ensures recognition for the writer(s)
Abstract	Describes what was done – 150 words
Key Words (some journals)	Ensures the article is correctly identified in abstracting and indexing services
Introduction	Explains the problem
Methods	Explains how the data were collected
Results	Describes what was discovered
Discussion	Discusses the implications of the findings
Acknowledgements	Ensures those who helped in the research are recognised
References	Ensures previously published work is recognised
Appendices (some journals)	Provides supplemental data for the expert reader

An author must realize that due to the rigid structure, a paper can be read at several level:

- Some people will refer to the title only
- Others may read deeper into the abstract
- Other will find the important information in the paper
- Others will read the whole article for a deeper understanding

Hence, the title is the most important component to attract people to read a paper. Title should be written as the advertisement of the paper and describe the content of the paper in clear and precise manner. After the title, abstract briefly summarize all of the problems, methods, results and conclusions so that the reader can decide whether or not to read the whole article. Many authors write last so that it reflect the whole content of the paper accurately.

The Introduction part should clearly state the problem being investigated, background of the research and reasons for carrying out the research. It also summarize related research and state the difference between the author's and published works. Some brief explanation of the research method may also written in this part. The Methods part provide the details of data collecting process so the readers can understand and replicate the research. The frequency of observation and types of data recorded should also mentioned. The measurements should be described precisely including errors of measurements or research design limit.

In the Results part, the findings should be objectively presented. It should be shown that the new results are contributing to the body of scientific knowledge. The questions and hypothesis of the research should be answered based on tables and figures presenting the findings. After that, Discussion/Conclusion part describes what the results mean and indicates the relation between the results and the expectation or the literature previously cited. The conclusion must not be extended beyond what is directly supported by the results to avoid a speculation.

Whenever the idea from previously published work is drawn, the source must be acknowledge. Any information that is not from the author's experiment and is not considered as 'common knowledge' should be recognized by a citation. Moreover, listing of unrelated reference should be avoided. There is a variation in how references are presented. It refer to guide for authors for the specific journal.

Suggested Writing Order

Although the structure of the scientific paper has been developed, it does not mean that the writing order should follow the structural order. In fact, it is suggested that the paper is written in the following order[5]:

- Title
- Method
- Results
- Introduction
- Discussion/Conclusion

- Abstract

The order is suggested based on which part is needed first to write another part. For example, the abstract should reflect the whole content of the paper. It means that all other parts are needed to write first before the abstract.

The Skill of Writing Paragraphs

A paragraph is a group of sentences related to each other. One paragraph should consist of one idea. There are at least three elements of a good paragraph[6] :

- *Unity*: all sentences in one paragraph should be united in one topic or idea.
- *Coherence*: there should be clear and logical relationship between the sentences.
- *Development*: the main topic or idea of the paragraph should be well explained by the existence of evidences, examples, or details.

Every sentences in a paragraph should be a group of words in a single idea. A group of words can be develop a sentence if it contain at least one subject and one verb. It can be written in active or passive voice. Although the active voice is generally preferred, the passive voice is acceptable when an author wants to focus on the recipient of the action rather than on the actor[6].

Article Submission and Reviewing Process[4]

The first and most important step before submission of an article is the selection of journal. The aim and scope of the journal should be matched with the written article. Otherwise, the article will be automatically rejected. Secondly, an author should think about the target of audience and the level of the article. Hence, the realistic chance of acceptance can be approximated. Thirdly, the author have to follow the guideline instructed, which can be vary for specific journals. Then the article can be submitted, and wait for the review process. Nowadays, many publishers provide an electronic submission process to speed up the review and editorial process. For the ethical issue, an article must not submitted to more than one journal at a time.

After submission, most journal editors will make an initial decision on an article. In this step the decision will be based on some technical issues, such as language, writing format, etc. If the article is written in good language and follow the guidelines, then it can be proceed to the review process. Otherwise, it can be rejected. Most of the editors appoint at least two referees, who may suggest to accept, accept with revision (minor or major), or reject the article. If the paper rejected, most of the editor will send the author the explanation of the decision. After the rejection, however, an author may submit the article to other journal. Figure 1 shows the flow chart of submission and reviewing process.

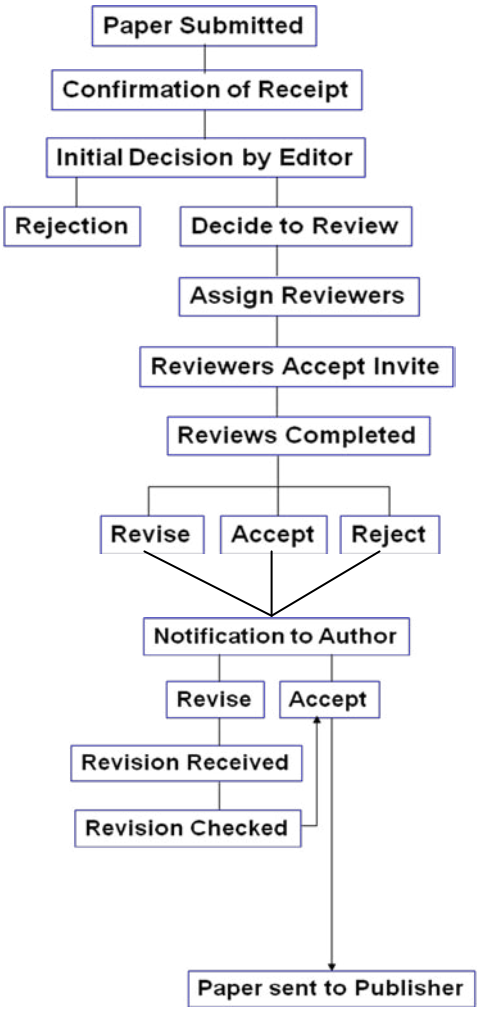

Figure 1: Flow chart of submission and reviewing process[4]

Once an article accepted, the author is considered to be a member of learning community in the specific area of study. He or she may be invited to be a reviewer for other's work.

Ethical Issues: Plagiarism

In a research, there are at least seven acts that an author must be avoided[5]:

- Data manipulation
- Duplicate a manuscript
- Redundant publication
- Plagiarism

- Author conflict of interest
- Animal use concerns
- Human use concerns

From all of the sins mentioned above, plagiarism is one of concerns since sometime an author do the plagiarism just because the lack of knowledge of the author about what the plagiarism is, or the author do the plagiarism unintentionally.

Plagiarism is defined as the act of presenting the words, ideas, images, sounds, or the creative expression of others as an author's own. There are two types of plagiarism: intentional and unintentional.

Examples of intentional plagiarism include[7]:

- Copying other's work
- Copy and pasting blocks of text from electronic sources without documenting
- Media "borrowing" without documenting
- Web publishing without permissions of creators

While examples of unintentional plagiarism include[7]:

- Careless paraphrasing
- Poor documentation
- Quoting extremely
- Failure to use the author's own words

In summary, it is important to document materials obtained from other sources. However, there are some conditions when an author does not need to document, such as the following conditions[7]:

- The author discuss his or her own experiences, observations, or reactions.
- The author compiles of the results of original research, from experiments, etc.
- The author using knowledge that has been already known widely (common knowledge).

Conclusions

Writing for publication in a reputed international journal is an interesting challenge that people in academic field should be faced. It is one aspect of being scholar that needs good time management

and persistence. Once an article is accepted, it means that an author is accepted as member of a global learning community in the specific area of study. Many new authors face difficulties in writing. The only solution in this problem is keep writing, writing and writing. As one said, *"There is no way to get experience except through experience."*

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RECIPROCAL TEACHING MATH PROBLEM SOLVING IN CONNECTION WITH THE FORMATION OF CHARACTER

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Abstract

The focus of school mathematics learning is problem-solving approach. This is done to provide adequate supplies to students in order to have various forms of problem-solving skills in mathematics and also to acquire knowledge and the establishment of ways of thinking and acting in solving the problem. This is closely related with the formation of one's character, both in solving problems faced and the daily behavior of the person concerned.

To obtain optimal results and benefits in solving mathematics problems should be done through solving steps are properly organized to allow the implementation of a systematic problem solving and the result is not only a correct solution, but also terbentukya mindset well structured in a person when facing a problem to be solved.

One form of the problem in mathematics is a problem that its open-ended, that is a problem that requires more than one correct answer, or problems that require a variety of strategies to get one correct answer from a given problem. Therefore, to solve the problem of open-ended thought process a person needs a complete and systematic, that in formulating the strategy alternatives led to a correct answer or raise a variety of strategies that led to unity of the problem of correct answers given.

Reciprocal teaching has a strong linkage with solving the problem, the main mathematical problem in the form of open-ended and was developed to help teachers use learning dialogues that are working together to teach self-understanding in the classroom. Through Reciprocal Teaching comprehension strategies students are taught four specific self-regulation that is summarizing, submission of questions (questioning), clarifying, and prediction or predicting.

Conclusion of this paper are: (1) to obtain optimal results and benefits in solving mathematics problems should be done through solving steps are properly organized to allow the implementation of a systematic problem solving and the result is not only a correct solution, but also terbentukya mindset well structured in a person at the time resolve the problem, (2) Reciprocal Teaching has a fairly strong association with problem solving, and Reciprocal Teaching plays an important role in problem solving, math problem-shaped main kontruktivis and open-ended; (3) Application of Reciprocal Teaching in the learning of mathematics problem solving to build character in student / student, for example, be used to think reflectively, to think alternatives, will be used to work systematically, there will always be in control of doing various activities, planning properly before making a activity, no monitoring and evaluation of activities undertaken. Therefore, the Reciprocal Teaching strategies need to be taught to students.

Keywords: *Mathematical Problems, Open-ended, Reciprocal Teaching, Constructivist, Formation of Character.*

A. INTRODUCTION

The focus of mathematics learning in schools ranging from elementary school through high school is a problem solving approach. This is done to provide adequate supplies to students in order to have the ability to solve various forms of mathematical problems. They will also be useful to obtain knowledge and the establishment of ways of thinking and acting in solving the problem. This is closely related with the formation of one's character, either in solving his problems and in the daily behavior of the person concerned.

To obtain optimal results and benefits in solving mathematics problems should be done through solving steps are properly organized to allow the implementation of a systematic problem solving and the result is not only a correct solution, but also terbentukya mindset well structured in a person when facing a problem to be solved.

One form of the problem in mathematics is a problem that its open-ended, that is a problem that requires more than one correct answer, or problems that require a variety of strategies to get one correct answer from a given problem. Therefore, to solve the problem of open-ended thought process a person needs a complete and systematic, that in formulating the strategy alternatives led to a correct answer or raise a variety of strategies that led to unity of the problem of correct answers given.

In conjunction with learning, problem solving should be taught to students because it has a specific purpose. According to *Charles, Lester and O'Daffar* (*Laurens, 2009*) mentions that the purpose of teaching math problem solving include: (1) *to develop thinking skills,* (2) *develop the ability to select and use problem solving strategies,* (3) *develop attitudes and confidence in solving problems,* (4) *develop the ability to monitor and evaluate their own ideas for solving problems*.

Objectives are taught solving the problem mentioned above is has links with Reciprocal teaching of constructivist teaching methods. This basic method is to direct students to understand text, combined with their previous experience. In addition, teachers who support the process and want to use the Reciprocal Teaching strategies need to be trained and have support when they encounter situations that require modification. Teachers must be able to demonstrate the strategy, gradually give over the leadership lessons to students, and later became a facilitator for groups of students (*Hacker*, 2002).

B. DISCUSSION

1. **Mathematical Problem Solving and Implementation In Character Formation.**

   Each person must have experienced problems in his life. Problems and problem solving are part of the life process that must be passed to everyone and is a means to ensure the maturation of its existence, both as individuals and as part of its environment (Jonassen, 2004). Likewise, problem-solving skills are a must-have basic skills for everyone to take their lives better (Kirkley, 2003).

Problems are relative, which means trouble for someone is not necessarily a problem for others or for that person for a few moments later. This is as stated *Schoenfeld* (1980) that: "*Is That problem solving problems is relatively*".

To determine a situation is a problem or not, is to see how a person reacts to the situation. If there is no strategy that can easily be found, then the situation is a problem, and vice versa when there is a strategy that can easily be applied, then it is not a problem (*Dossey,McCrone ,O ' Sullivan,Gonzalez ,2006*). The same is also presented Cooney, at. al. (1975) says that: ". . . *for a question to be a problem, it must present a challenge That can not be resolved by Some routine procedure known to the student"*. The question is a problem, if the question presents a challenge that can not be solved by a routine procedure that has been known to students.

There are several variations or the nature of the problem, namely on (1) *the knowledge necessary to solve the problem,* (2) *forms of presentation,* (3) *process conducted in the solution of problems* (*Jonassen, 2004*). Based on this, it can be found there, which is presented in a simple problem and the solution can be done by using the knowledge and processes that are not too complicated, but there is also a more complex problem, which requires knowledge and skill and involves a high activity in solving it. Likewise in seharai-day life, we often find problems that are simple and there are also problems that are complicated and complex, so difficult to solve.

Problem solving in mathematics is a higher-order thinking processes to solve problems because it takes a variety of strategies and incorporating several concepts to solve the problem (*Anonymous, 2007*). One form of the problem in mathematics that require higher level thinking process is *open-ended* problems. This is because in an *open-ended* problem solving takes a variety of alternatives to bring a variety of answers are correct or needed different strategies toward unity correct answers. Here are two examples of simple problems in mathematics that are *open-ended*.

1) A Rectangle has a circumference of 90 cm. How extensive these Rectangle?
2) Rina swim every three days, Doni swimming once every four days and swam Widi once every six days. If they swim together for the first time on 19 January 2011. What's the date again they swam together for the second time?

For problem (1) above, many possible correct answers, and depending on how to determine the length and width of Rectangle, which has a circumference of 90 cm. Problems (2), only one correct answer, but how to get that answer more than one kind.

In everyday life, many problems that require a variety of solutions or strategies to solve the problem. For example we often see through print or through electronic media about suicide cases, cases of abduction, rape cases, cases of corruption, abuse and so forth. All of that was based on the existence of problems in the life of the person concerned. People can commit suicide by hanging themselves or taking poison because dihianati her lover or because of problems in the household. A person can only do the kidnapping because there are certain motives, to make rape because there is a certain desire or motive, can engage in corruption because they want to get rich quick, to the abuse because there is a certain resentment.

Examples of cases along with the solution mentioned above is actually unnecessary, because there are still other solutions are better. If we have problems in this life, we'd better to think of various possible solutions, which can be chosen so that we be free from the problem that, because of the many solutions exist to solve a problem, there must be the best solution that can be chosen to solve the problem. This description suggests to us that when we mengelami problems, we always have to think reflectively and alternative thinking. Students as early as possible we should get used to reflective thinking and alternative thinking. By way of reflective thinking and alternative thinking they will be able to solve the problem properly, if they were dealing with a problem.

2. **Stages of Problem Solving Mathematics and Its Implication In the formation of character.**

In macro character education is divided into three stages, namely *planning*, *implementation*, and *evaluation results*. At the planning stage devices developed characters extracted, crystallized, and formulated using a variety of sources.

In the implementation phase developed a learning experience and learning processes that lead to the formation of character in self-learners. This process is carried out through the empowerment and the civilizing process as outlined as one of the principles of national education. This process takes place within the three pillars of education that is in units of education, family and community. In each of the pillars of education there will be two types of learning experiences are built through the intervention of the two approaches and habituation. The intervention was developed to study the interaction and learning atmosphere is deliberately designed to achieve the goal pembentulkan character by applying a structured activity. In order for the learning process effective, the role of teacher as role model is very important and decisive. Meanwhile, during the habituation created a situation, condition and strengthening that enable learners to the education unit, at his home, in a community to get used to behave according to the value and become a character that has been internalized and personalized from and through the intervention process. Civilizing process and the empowerment involves giving examples, learning, habituation, and reinforcement must be developed in a systemic, holistic, and dynamic.

At this stage of the evaluation results, carried out assessment for continuous improvement program designed and implemented to detect character in self-actualization of learners as an indicator that the civilizing process and the empowerment of the characters it worked well, producing a strong attitude, and an argumentative mind, (*Events Calendar, 2010 : 76-78*).

To solve the problem required many steps and problem solving strategies. One of the stages of mathematical problem solving is often referred to phasing *Polya* (1973), which suggests four steps that need to be done, namely: (1) *understand the problem*, (2) *make a settlement plan*, (3) *implement a plan that has been made*, (4) *look back (looking back) or double-check the answers obtained*.

Phasing *Polya* above shows that problem solving is a process that consists of several interrelated steps, and the details given in the following description.

a) Understanding the problem involves understanding the various things that exist on issues such as what is known, what was asked, what data are available, what terms, whether conditions are adequate to determine the matter in question.
b) Devising a plan solution includes various efforts to find a relationship problem with another problem or the relationship between the data with the unknown, and so on and eventually one has to choose a solution plan.
c) Carrying out the plan, including checking every step of the solution, whether the step taken is correct or can be proven that the move was correct.
d) Looking back, including double-check the answer obtained and the testing of the resulting solution.

Troubleshooting steps mentioned above is a systematic procedure carried out when we solve the problem. By following the troubleshooting steps above, not only will produce the correct solution, but also very possible establishment of a systematic process of student thinking as well. As the implication is that students should be familiarized us to think systematically, either in work or in solving problems.

3. **Reciprocal Teaching in Mathematics Problem solving and Implementation In the formation of character.**

Reciprocal Teaching is an approach to teaching students will learn strategies. Reciprocal Teaching is a social interaction in cognitive development and discussion in an effort to clarify and revise thinking to identify appropriate solutions and to support student success (*Vygotsky, 1978 in Galloway, 2001*). Meanwhile, according to *Nur and Wikandari* (2000: 16), Reciprocal Teaching is a *constructivist* approach is based on the principles of creation / submission of the question. With Reciprocal Teaching teachers to teach students cognitive skills by creating a learning experience, through the modeling of certain behaviors and then help students develop these skills on their own efforts with encouragement, support and a system of scaffolding (*Ann Brown and Annemarie Palincsar*, in Nur, 2000: 48).

The purpose of Reciprocal Teaching is to use the discussion to improve reading comprehension, develop skills of self-regulatory and monitoring, and achieving an overall improvement in motivation (*Borkowski*, 1992 in Allen, 2003). Everyone in the classroom takes turns assuming the "techer" role. Each of you will lead the class discussion at some point.

Reciprocal Teaching primarily developed to help teachers teach their own understanding in the classroom. Through Reciprocal Teaching comprehension strategies students are taught four specific self-regulation that is *summarizing*, submission of questions (*questioning*), *clarifying*, and *prediction* (predicting).

1) *Summarizing*
   Starting with the watch strategy as a model teacher, practice with scaffolding and gradually begin the process of internalization for themselves, which in turn handed over the responsibility of teachers to students as leaders (*Allen*, 2003).
2) *Questioning*
   Internal processes are shown to students, so that the students become more confident and

eager to take part in class discussions because they get a better understanding about the process and how to solve math problems.

3) *Clarifying*
Modeled and practiced these skills externally. This is done so that students can understand the internal processes of both cognitive and gradually internalize themselves. They became more comfortable identifying the things that they do not understand and clarify the understanding, because the learning community in this process of acquiring the ability and knowledge of individuals for mutual benefit (*Hashey*, 2003).
Through a collaborative process, students have information to share understanding. Knowledge derived from their respective backgrounds and previous experiences (*Allen*, 2003). Identifying concepts that are not fully understood has become a valuable skill rather than a perceived weakness.

4) *Predicting*
Predicting helps students to confirm / revise the understanding of basic concepts of mathematics. It also helps them develop higher level thinking about mathematical problems. Thinking about what has and will occur to make students easier to predict and understand the subsequent settlement and focus on key concepts in math problems.

Use of this approach was chosen for several reasons, namely: Increase awareness, provide opportunities to monitor their own understanding and very supportive collaboration (discussion).

Reciprocal Teaching procedure done first by the teacher asks the students to read literature in small groups, then the teacher models the four skills (asking questions that can be asked, summarizing the material, clarify difficult points, true or false) (*Nur*, 2000: 49). The group should include no less than four students and no more than six students, so that all students have equal opportunities to practice strategies. Furthermore, the teacher appoints a student to replace its role as a teacher and act as discussion leaders in the group, and teachers to switch roles in the group as a motivator, mediator, coach and provide support, feedback, and enthusiasm for students. Gradually and gradually shift the responsibility of teachers teaching more students in the group, and help monitor the thinking and strategies used. Teachers can collaborate with students to create clear expectations and create a comfortable classroom environment for teachers and students.

3.1. Introduce reciprocal teaching

In the early application of Reciprocal Teaching notify teachers will introduce an approach / learning strategies, explains the purpose, Benefits and procedure. Further modeling began by explaining briefly about the concepts and material that will be discussed. Then explain and teach that when there is material or finished reviewing the activities to be performed are:

a) Thinking about the question-important question / problem of mathematics that can be filed and make sure to answer it;
b) Create an overview / summary of the most important information from the problem of mathematics or material that has been in the study;
c) Predicting math problems that may be discussed further; and

d) Record if there are things that are less obvious, and tried to discuss the problem solving process. (*Nur and Wikandari*, 2000: 20)

Once students understand the skills above, the teacher will appoint a student to replace his role in the group. Initially appointed students who have the ability to lead the discussion, the next in rotation every student to feel / do the role as a teacher. After the introductory session ended, the teachers explain to students why, when and how that strategy is used.

3.2 Daily Procedure

In the continuation phase of implementation Reciprocal Teaching through the daily procedure as follows: (*Nur and Wikandari*, 2000: 22)

a) Provided the teaching materials according to the material you want to look for problem solving
b) It was explained that the first segment to act as a model teacher
c) Students are required to understand the heart or reviewing material that will be discussed
d) If the student has completed the first part, do the following model:
   - The question that I expect will be asked teachers are:
   - The teacher gives students the opportunity to answer that question. If necessary they may use her own words
   - Summarize the basic concepts of mathematics required. If you need to appoint one of his students to read summary
   - To provide students the opportunity to predict the basic concepts needed in the next math problem
   - To provide students the opportunity submit comments or find things that are not clear on teaching materials.
e) Students are asked to provide comments about the teaching of the new place
f) Segment followed by material / about the next, and choose one student who will act as "*teacher-student*"
g) Students are trained / directed role as "*teacher-student*" all the activities. Encourage other students to participate in discussions, but always gave the "*teacher-student*" had the opportunity to lead the discussion. Provide much feedback and praise to the "*teacher-student*" for its participation
h) In the days that followed, the longer a teacher to reduce role in learning, so that the "*teacher-student*" and another student's own initiative to deal with teaching and learning activities. The teacher's role then as a moderator, keeping the students stay on track and help overcome difficulties.

Benefits of Reciprocal Teaching them teaches how bepikir and discuss, understand how to understand the context, and in a story about math. In a study by *Hashey* (2003) the teachers see an increase in student confidence and success in the understanding and use of strategies. At the end of the study, students commented that the Reciprocal Teaching helps comprehension questions, understand the meaning of questions and understand other people's opinions (*Hashey*, 2003).

In addition, a modified version of the Reciprocal Teaching to make students understand math story problems. One student was assigned to be the leader of the group, the first student to explain each word or phrase that is not understood, then the leader uses questions to guide in identifying important part of the problem. Furthermore, the leader summarizes the objectives of the problem and eventually guide the group in making plans to solve the problem. Everyone in the group take turns to be leader.

Implementation of the application of Reciprocal Teaching in the formation of character is when we do something about the activity should always be in control of ourselves. With the control of a person, it is possible that the person in doing various activities will be carried out regularly and controlled. For that, the students we should always apply the Reciprocal Teaching in a variety of daily activities, especially in terms of learning to plan, monitor and evaluate the results of the learning process of learning.

Through the application of Reciprocal Teaching strategies, will manifest a systematic problem solving process, well structured, built on a logical framework, and enables to obtain an appropriate solution. From the students' own, Reciprocal Teaching strategies are very important in building a strong foundation of our thinking to be applied in a variety of conditions and the complexity of problems encountered.

C. CONCLUSION

Based on the descriptions above, we can conclude the following points:

1. To obtain optimal results and benefits in solving mathematics problems should be done through solving steps are properly organized to allow the implementation of a systematic problem solving and the result is not only a correct solution, but also terbentukya mindset well structured in a person when solving problems.
2. Reciprocal Teaching has a fairly strong association with problem solving, and reciprocal teaching plays an important role in solving problems, mainly in the form of *constructivist* math problem and *open-ended*.
3. Application of reciprocal teaching in the learning of mathematics problem solving to build character in student / student, for example, be used to think reflectively, to think alternatives, will be used to discuss and work systematically, there will always be in control of doing various activities, planning properly before making a activity, no monitoring and evaluation of activities undertaken. Therefore, the reciprocal teaching strategies need to be taught to students.

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CORRESPONDENCE INFORMATION SYSTEMS AT UNIVERSITY

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Abstract

The most common problem encountered at an educational institution relating to the daily administrative problems with respect to such correspondence (incoming mail, outgoing mail) on a section / unit (students, lecturers, unit / section) is often the loss of file letter (incoming, outgoing), and not monitoring existence incoming or outgoing mail even answer the letter which must be repaid can not quickly returned, officials are not in place (beyond the task), can not be a recapitulation of letters (in, out) so it will be a bad precedent for the units / sections that have been sent letters. With applications made e-letter model (not the same as email) in accordance with this requirement then all the above problems will be solved. For the academic community who sent a letter would be to monitor the existence of the letter sent. Likewise, sections / units that received the letter will also be monitoring the incoming mail that has the disposition to the sections / units that are linked. It will be created efficiencies in each section / work unit so that it can increase the productivity of work on these educational institutions.

***Keywords** : e-letter, incoming mail, outgoing mail.*

1. Introduction

1.1Background

The most important thing in a college institution, one of them related to incoming mail is often late reply from the recipient mail, files incoming mail that is not archived well often cause loss of file, the leadership is not in the room so could not check incoming mail . So that would prejudice, hinder parts / other units who expect a quick reply from a letter that has been delivered and services to students will be disrupted

1.2 Purpose

Making electronic mail information system (correspondence) based on open source at a college institution, so the sender can know the existence of the letter.

1.3 Database Design

To collect data related to incoming or outgoing mail, username and another, which was given its name dibuatkanlah db_surat database using MySql database, consisting of two tables (data_user, data_surat).

Table data_surat consists of several fields (id, sender, no_surat, p., sifat_surat, derajat_surat, isi_ringkas, origin, to, no_agenda, code, tgl_kirim, userfile, userfile2, carbon copy, tembusan2, tembusan3, tembusan4, tembusan5, tembusan6, isi_tembusan, disposition , disposisi2, disposisi3, disposisi4, isi_disposisi, pendisposisi) as the primary key is id

Table data_user consists of several fields (username, nip / NPM, name, structure, passwords) as the primary key is to nip.

1.4 Design Input

To realize the correspondence information systems at the University had been made stages as follows, including:

1.4.1 Index Page

Index page is a page view that is the first time out at first user to type / write the url address. Then the user will be asked to write down your username and password, if both the intended correct it will appear to the main page. Conversely, if the username and password that is meant one or not known then it will remain on the index page. Username and password must be made by admins, as people (civitas academic) at the University as an authority in order to use the system information and correspondence.

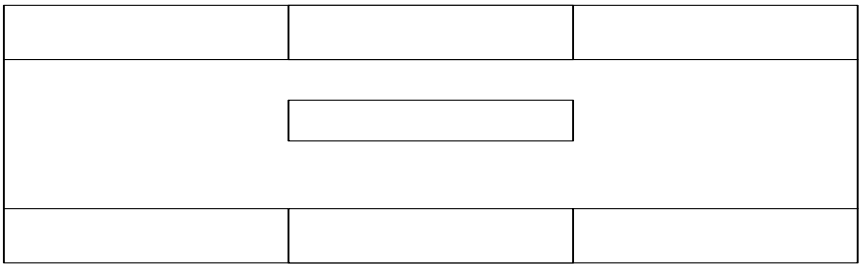


Figure 1: Index Page

1.4.2 Main Page (Inbox, Outbox)

Main page or main menu is a page that will appear after the username and password are entered correctly. On the main menu will appear and visible incoming mail that is divided into three types (to, disposition, copies), there is also a menu bar menu to send a letter, knowing the existence of the letter, outbox, recapitulation (inbox, outbox) and logout.

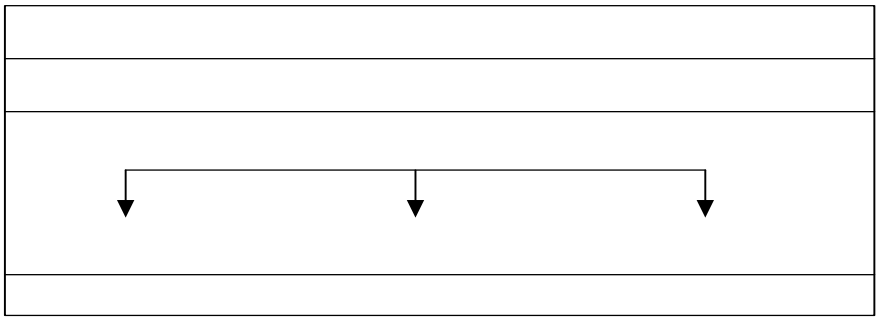


Figure 2: First Menu

1.4.3 Recap Page (Inbox, Outbox)

Recap page is a menu that can be used to recap on incoming mail and outgoing mail is also based on daily recaps, weekly, monthly and yearly.

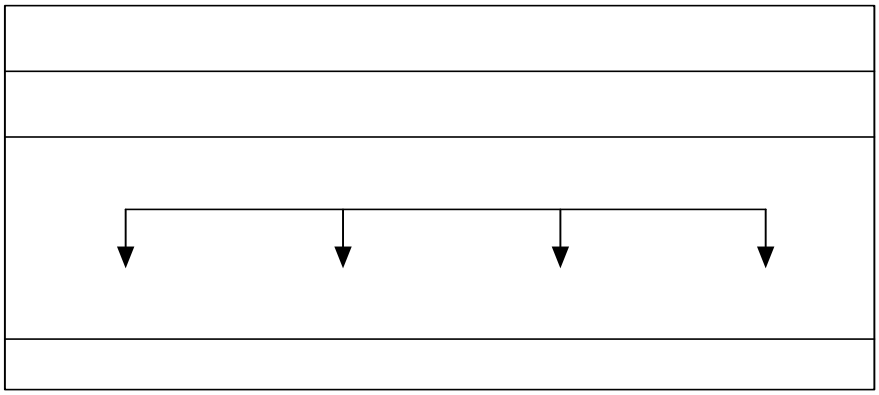


Figure 3: Inbox/Outbox Recapitulation

2.1 Program Output Results

From the input design index page that has been created it will look like in figure 4

.

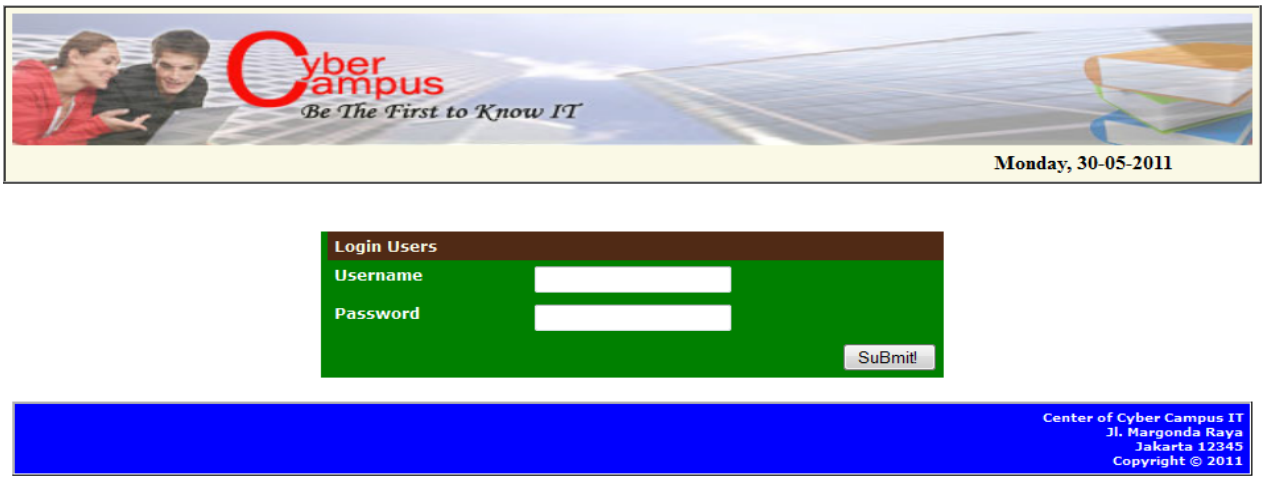


Figure 4: Index

As an example of data that has made us to enter the username = and password = pr1 pr1, as in figure 5.

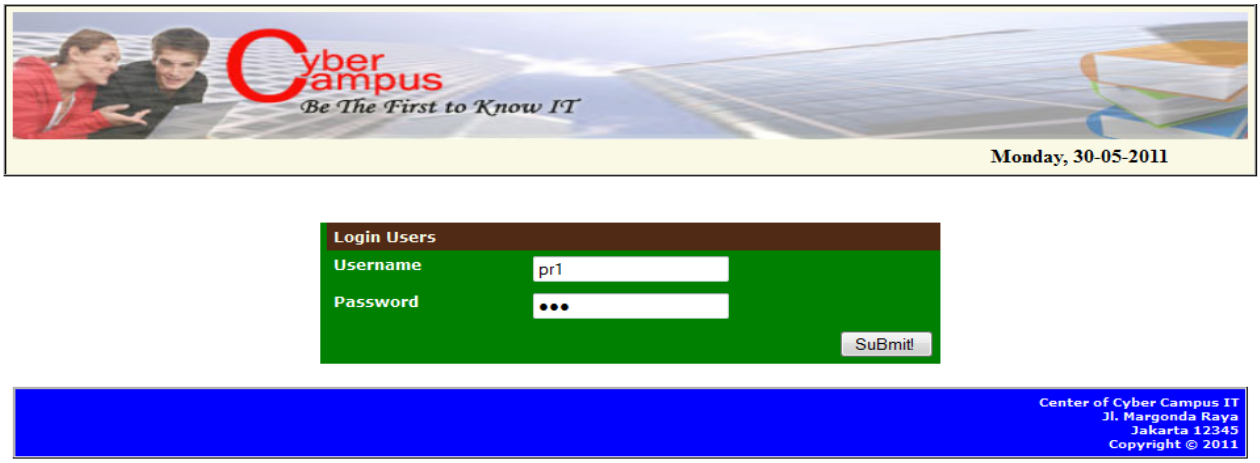


Figure 5: Login

Then username = pr1, on the main page or main menu should look there are three letters signed by different types.

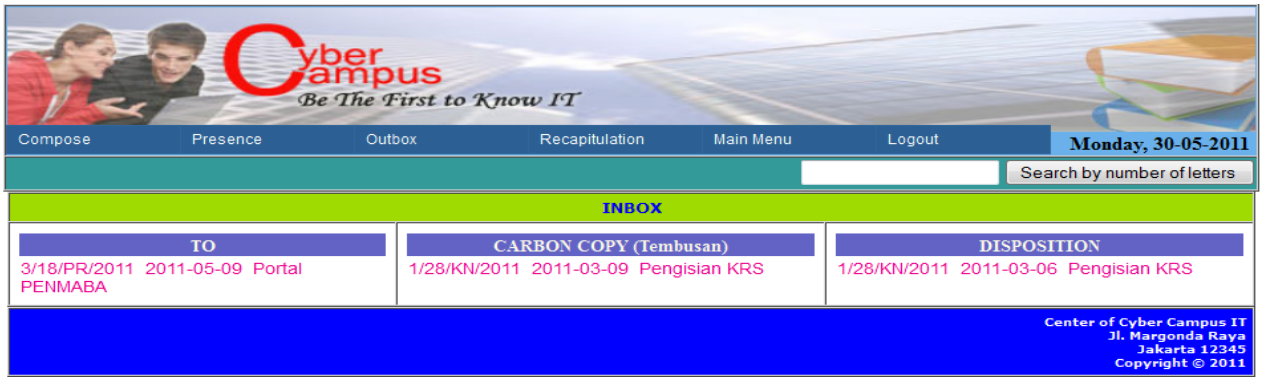


Figure 6: Fisrt Menu

If one of the main menu we choose (to) then there is the view detailed in his letter as in figure 7, the username can read the brief letter, origin, download files and can directly reply to or respond to the contents of the letter.

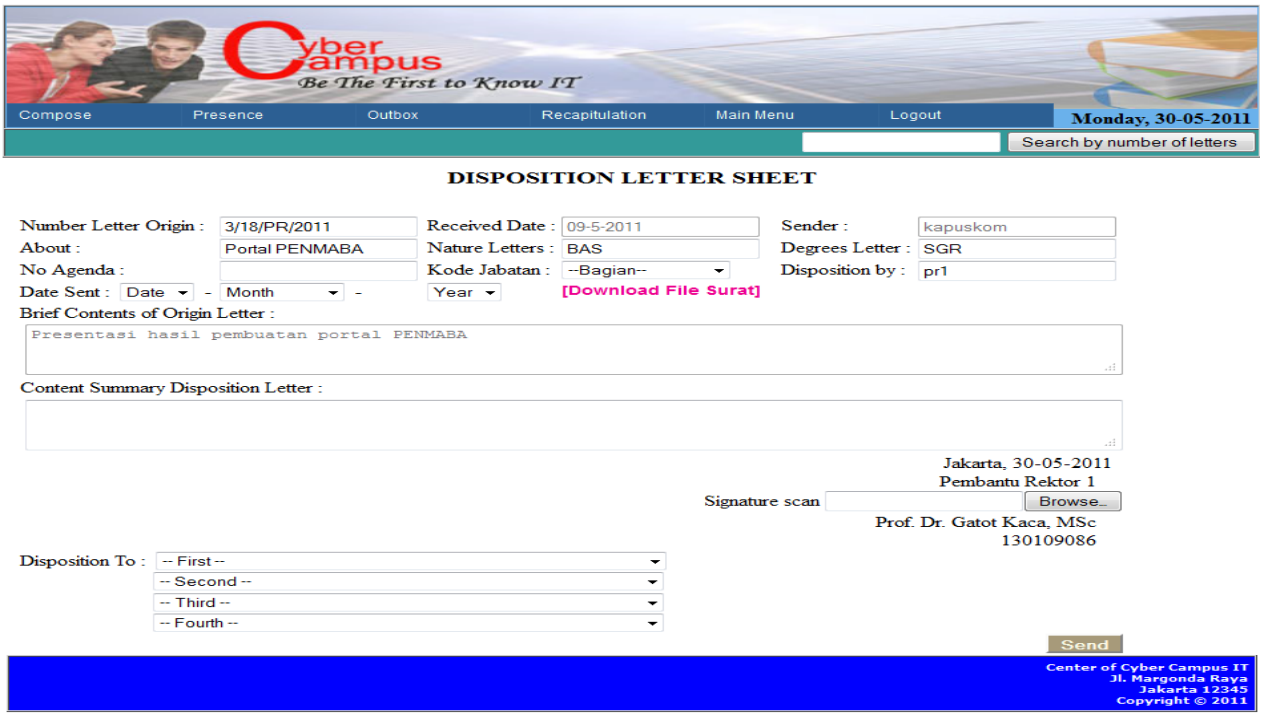


Figure 7: TO Inbox

If the username you want to send a letter then just click the Compose menu (to, copy). For example in figure 8 username sent a letter to the species.

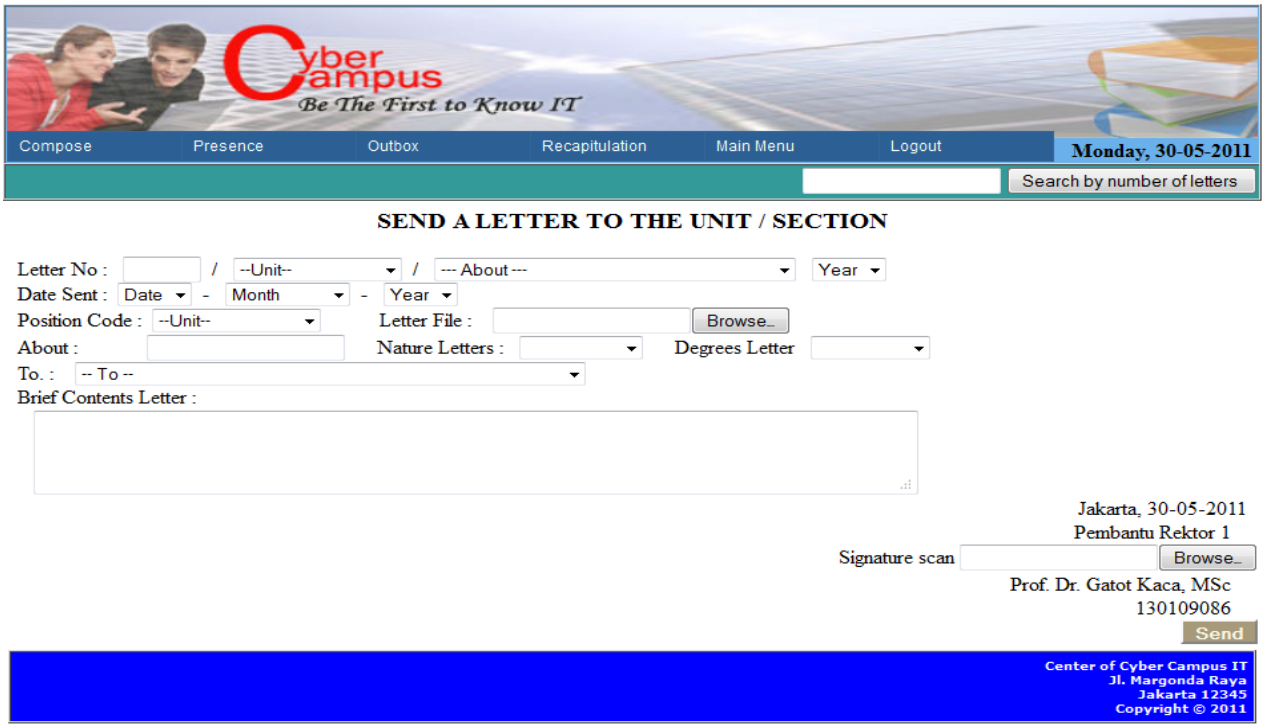


Figure 8: To Sent

On the menu the existence of the letter (sent, disposition, carbon copy) by the username if we click, take a sample as in figure 9, the type of letter that didisposisikan by username.

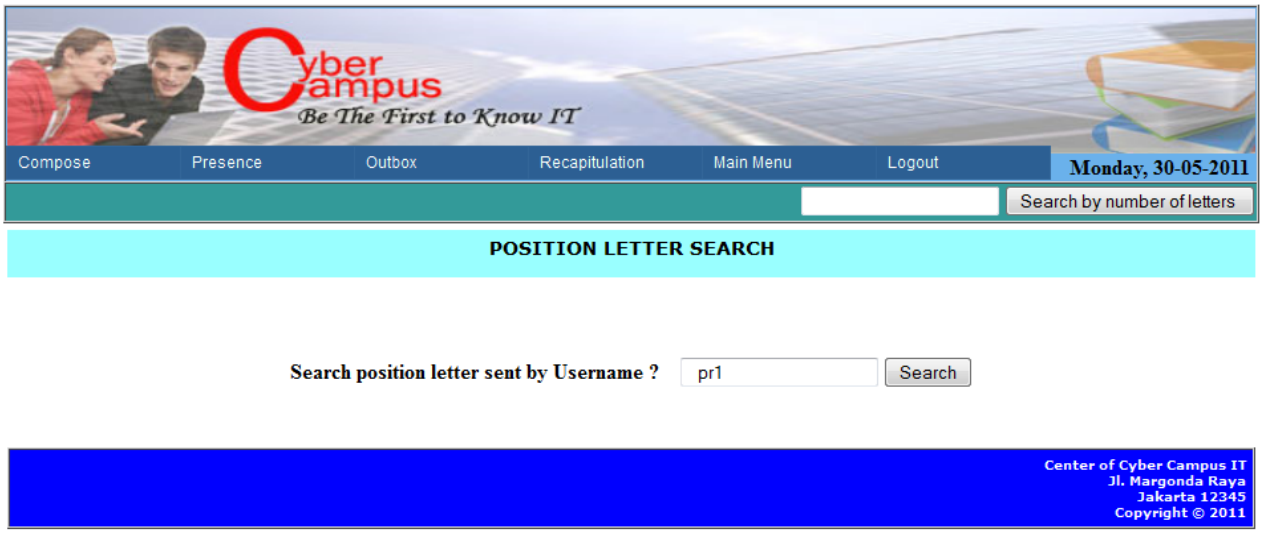


Figure 9 : Disposition by Username

The result as in figure 10

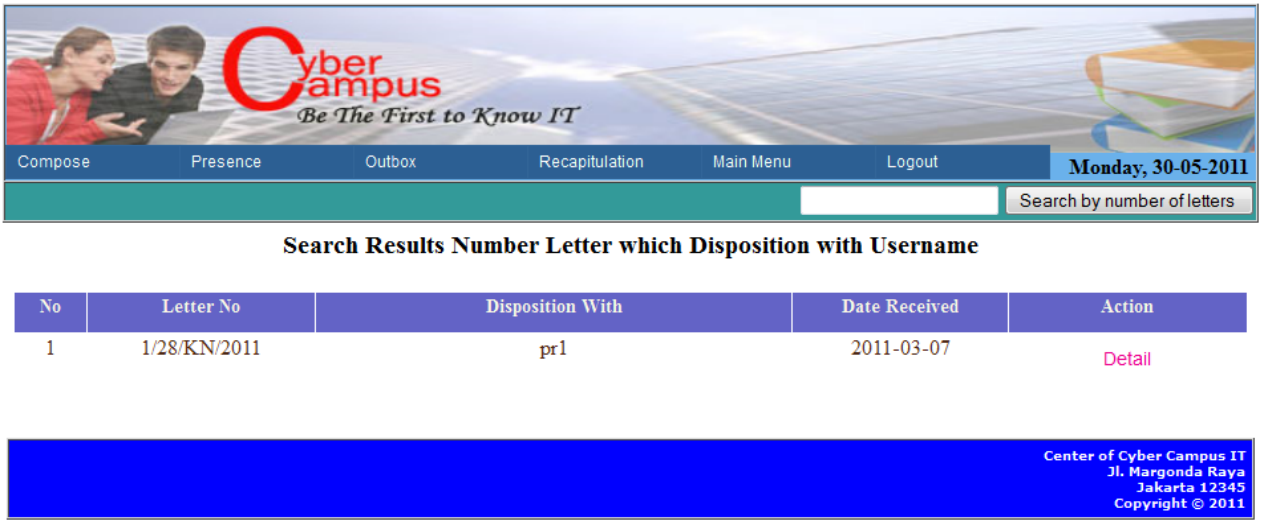


Figure 10: Disposition Letter

If detail is clicked will be evident from a letter of travel until the end of the letter in which position.

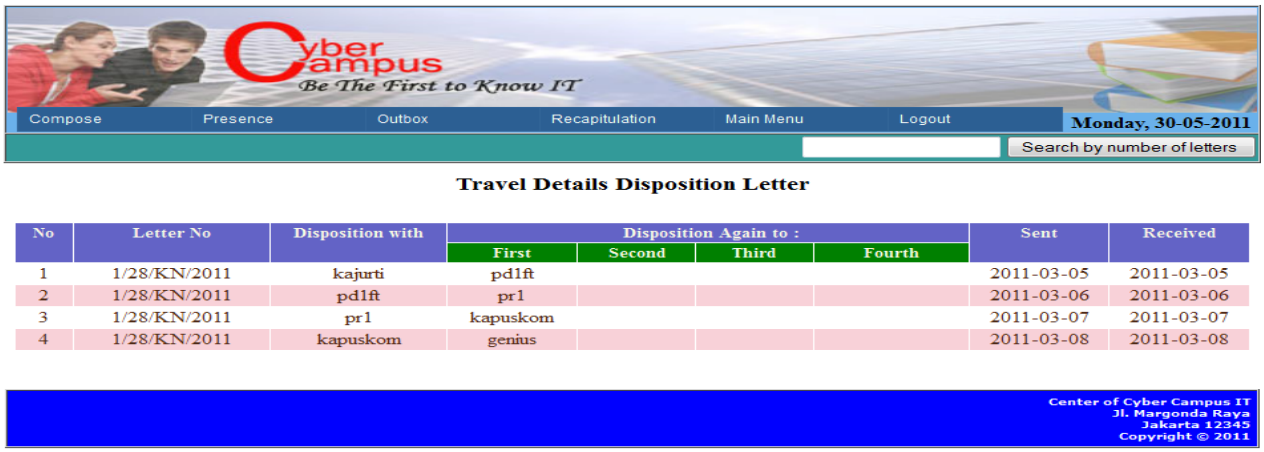


Figure 10: Letter disposition detail

If your username outbox then clicking the menu bar will appear as in figure 11, the username has three outgoing mail that has been made.

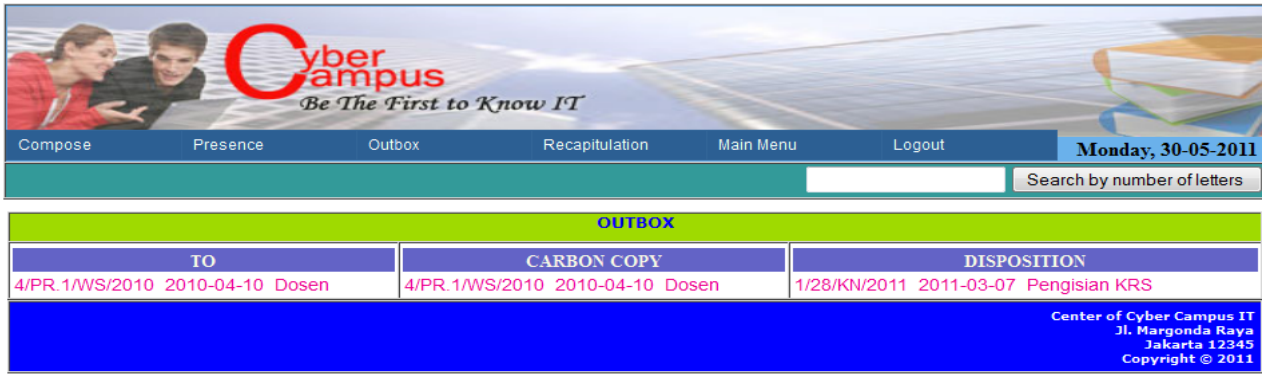


Figure 11: Outbox

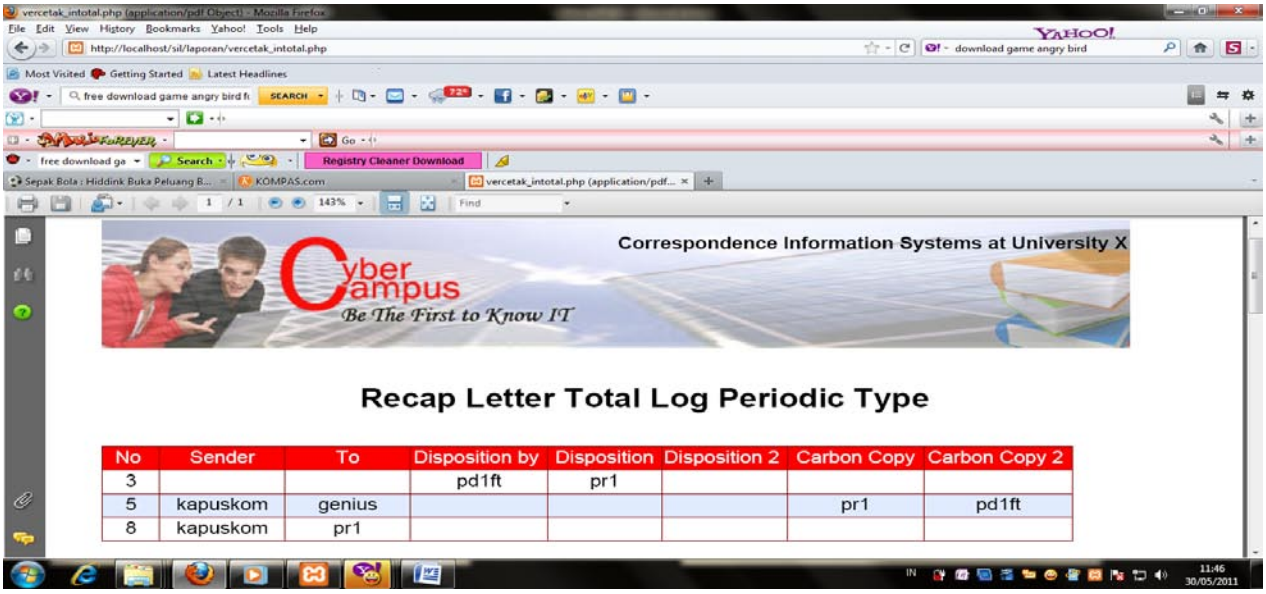
Username if clicking on one letter out then it will look like figure 12 (to)

Figure 12: To Outbox

Username if clicking the menu bar recapitulation inbox as shown in figure 13 (total)

Figure 13: Total inbox recapitulation

As a result of the recapitulation of the total incoming mail as a pdf as a report, as in figure 14 below.



No	Sender	To	Disposition by	Disposition	Disposition 2	Carbon Copy	Carbon Copy 2
3			pd1ft	pr1			
5	kapuskom	genius				pr1	pd1ft
8	kapuskom	pr1					

Figure 14: Total Inbox

Username recapitulation if clicking the menu bar as shown in figure outbox 14 (total)

Figure 15: Outbox Total Recapitulation

As a result of the recapitulation of the total outgoing mail in a pdf as a report, as in figure 16 below.

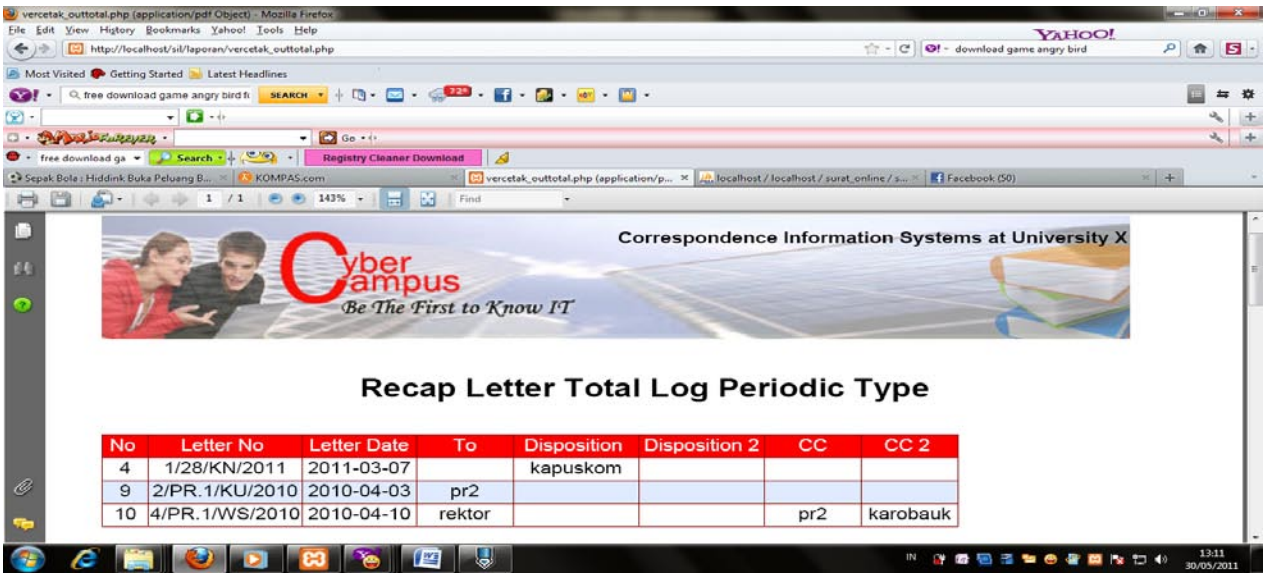


Figure 16: Outbox Total

3.1 Discussion and Analysis

All users who will use the information system of this electronic correspondence must be registered first to the admin which will be given the right to access this information system in the form of a username and password by admin. So the username that has access rights that can identify the existence of the letter sent, disposition, and forwarded by him. In the presence of incoming mail and outgoing mail can be monitored by the username then it will make it easier to know of its existence, if you wait too long for a reply or an answer, so the productivity of each department / unit can be upgraded, to provide better service to the academic civitas campus.

With a menu as in figure 14 recapitulation of the total incoming mail inbox there are three different types, looks the same as the number of main menu enter the three letters as in figure 6. Likewise for the recapitulation of the menu is the same exit.
Concerns about missing mail files will not exist anymore, the old reply, because all electronic correspondence files are stored in a database on the server.

4.1 Conclusion

From the electronic mail information system applications it can be concluded:
1. Can monitored the presence of incoming mail / outgoing mail that was sent by your username somewhere else, anytime, via the iPad, smartphones, mobile phones, notebook.
2. Using paper for a lot of correspondence has been abandoned so that we may leave campus to go green.
3. Wherever, whenever a head at the level of department, faculty, the rector, and section or other relevant units that will be able to monitor, monitor and reply to incoming electronic mail on each part, so that will create efficiency and effectiveness of the administration in particular letter enter a higher education institution for excellent service to students.
4. Recapitulation incoming mail and outgoing mail can be made to the reports based on daily, weekly, monthly and yearly.

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IMPROVEMENT PROCESSES TO SETTLE PROBLEM REAR FENDER OBLIQUE WITH SIX SIGMA

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Abstract

Rear's moment clamping in rear's moment assembly regard repair rear fender's case Oblique since clamping on can't yet settle position accuracy of rear's moment. Assembly process from rear fender also regard rear fender's case Oblique since part's shifting effect impac which is accepted one rear fender's time is assembled. Fixed up that will be done is as follows: (1) Jig's Moves processes stay rear's moments; (2) repair processes Clamp; (3) part's assembly Method. Base first phase analysis gets at concludes that setting's factor regard Repair Rear Fender's happening oblique. Setting' s factor regard Repair Rear Fender' s happening Oblique. For NG's motor: (1) Arm Swing's afters Point is traded: + 10 mm states: NG; (2) Rear Fender's afters Point is traded: + 11 mm states: NG and (3) Frame afters Points Body is traded: + 2 mm states: OK meanwhile For motor OK (1) Arm Swing's afters Point is traded: + 0 mm with state: OK; (2) Rear Fender's afters Point is traded: + 0 mm with state: OK; (3) Frame afters points Body is traded: + 9 mm states: NG. base explanation upon can conclude repair rear Fender's cause oblique is body's frame.

Rear Fender's percentage Oblique to be down by total reject 1443 June period next year by total productions 282548 , PPM 5107, Sigma is Level 4,05 . Repair Rear Fender Oblique June s / d. October 2007 as big as 13,43 % of Assembly's case. Full scale Cost Of Poor Quality = (Mh Repair x Total Reject)/prod plant 1 → (Rp. 2786. 5,- X 348)/342863 = Rp. 2,88/units. Saving Cost = Rp. 56,25/ Rp's units. 2,83 / units = 53,27 /units. Full scale Repair RFM'S Final Year 2007 as much 7000 case units, So COPQ = Full scale Reject x MH Repair =7000 Unit x Rp 2786.5,- = Rp 19.505.263,- Saving Cost per year n = Rp. 261.044.507,- Rp. 19.505.263,- = Rp 241.539.244,-

Keywords : Six sigma, rear fender Oblique, DMIC

1. Introduction

One that intended with rear fender Oblique is positioning rear fender to tyre exceed permissible tolerance bounds or standardized. There is bounds even its tolerance is ± 3 mm. Base annual data to be gotten data as figure 1.

Full scale Repair Rear Fender's Final Oblique Year 2006 as much 93683 case units, So **Full scale Cost Repair RFM Year 2006** = Full scale Reject x MH Repair 93683 Unit x Rp 2786.5,- = **Rp 261.044.507,-** . Seen from data upon, rear fender Oblique is problem already long time happen (chronic) so one is needed is mark sense Preventive's activity and corrective. To know whats causation rear fender Oblique.

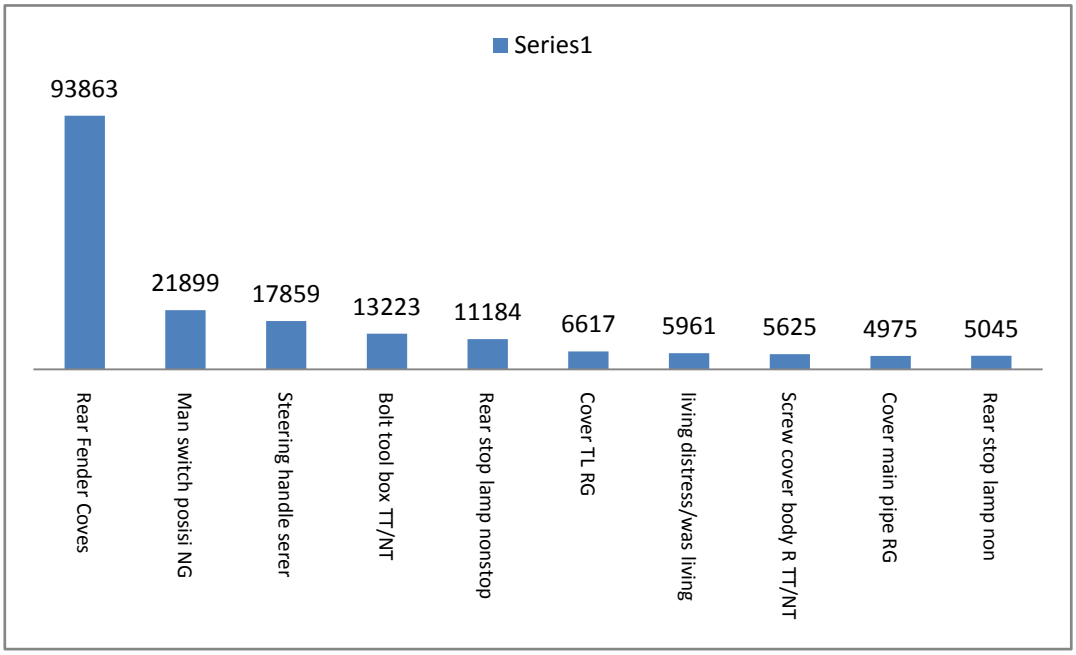


Figure 1: Case Note Invalids

2. Theory

According to Gasperz (2002), available six aspect key in concept application *Six Sigma*, which is: (1) customer Identifications; (2) product Identifications; (3) requirement Identification in memproduksi product for customer; (3) Definition process; (4) Avoid faults in process and remove happening dissipation; (5) Step-up process continually making for targets of this concept.

Meanwhile if concept *Six Sigma* applied in manufakturing's area, available six aspect who shall be noticed, which is: (1) product characteristic Identifications which will satisfy customers; (2) Clasify all quality characteristic most conceive of CTQ *(Critical To Quality)* individual; (3) Determine if each CTQ that can thru restrain operation significant, machine, job process etc.; (4) Determine tolerance maximum boundses (USL'S point and LSL) to each CTQ accords that desirable by customer; (5) Determine variation maximum process to each CTQ; (6) Change product design and / or processes in such a way face to be able to reach target points *Six Sigma,* one that matter has

ability index process C *pm* minimum equals two (C *pm* > 2). Sigma Seriing's zoom is linked with kapabilitas processes, one that is accounted deep *Defect Per Million Opportunities.*

Remedial process in *Six Sigma* known by DMAIC(*Define, Measure, Analyze, Improve and Control)* . There is explanation even hits to process DMAIC'S repair, are as follows: (1) *Define* are subject to be word to team what does become aim and fixs their grasp to assess potential of project; (2) *Measure* are subject to be gather data that figure condition and faced problem zoom. That gathered data, first will be utilized on this phase, with gathered data sub is utilized to bear out fixed up on succeeding phase; (3) *Analyze* are subject to be make a savvy of information that is gotten, to can then be made a causality of that information, so gets target resultant of *defect*, *process delay* etc.; (4) *Improve* on this phase is made an action plan(*action plan*) to perform quality step-up *Six Sigma* , to then that plan diimplementasikan; (5) *Control is* to make sure that benefit or gain already being gotten from this process awake regular, until and but marks sense one therewith data knowledge a new one the better to run process.

3. Result and Discussion

3.1 DEFINE – CTQ Deployment

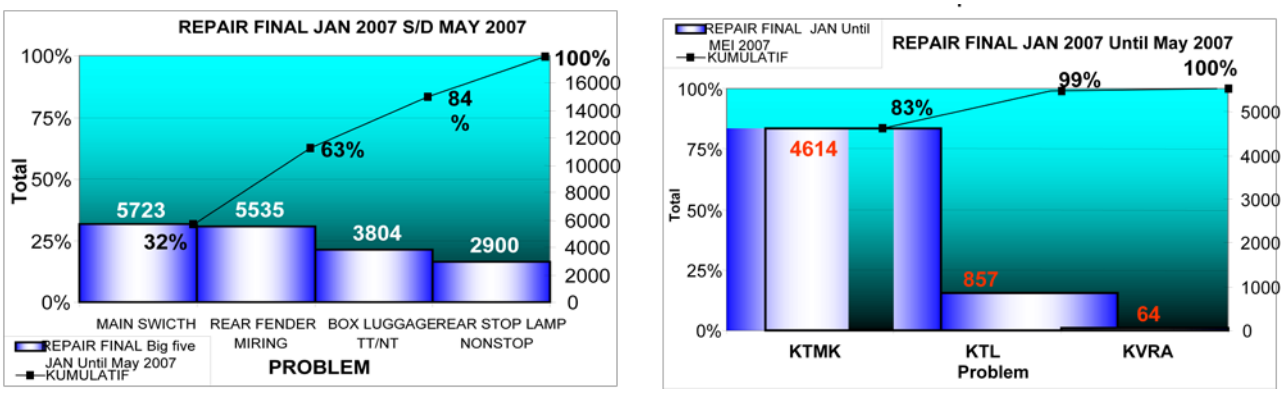


Figure 2: Pareto Diagram

Table 3: Matrix Correlation Problem

Main swicth posisi NG	4	M			M				24
Rear Fender Miring	3	M	H	L			H		66
Bolt box lougage TT/NT	2		M			M			12
Rear Stop Nonstop	1				I				1
Total		21	33	3	13	6	27		

QFD Controls
☑ View Total ☐ View Results

3.1.1 Project Identification

Rear fender Oblique is complex problem. There are many involves part part compiler amongst those: (1) arm swing; (2) rear fender; (3) frame body and (4) setting factor.

Arm Swing	**Rear Fender**	**Frame Body**	**Setting Factor**

Figure 2: Project Identification

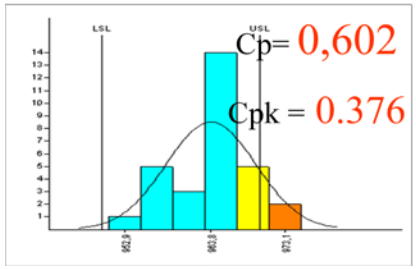
3.1.2 Logic Tree Rear Oblique Fender

Figure 3: Logic Tree Rear Oblique Fender

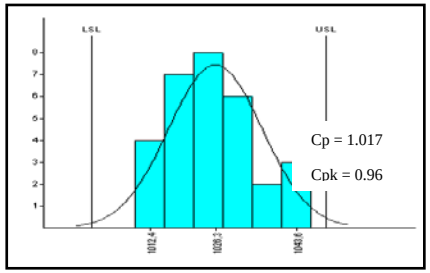
3.2 Measure

3.2.1 Measure – Part 1 (Assy Unit)

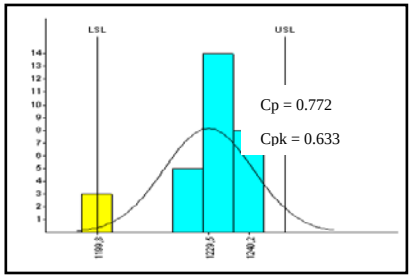
Hole 1

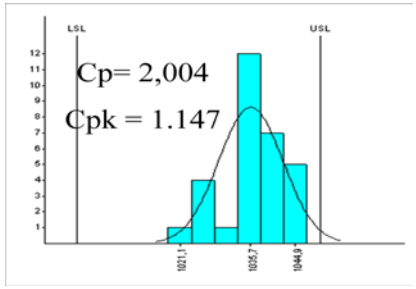


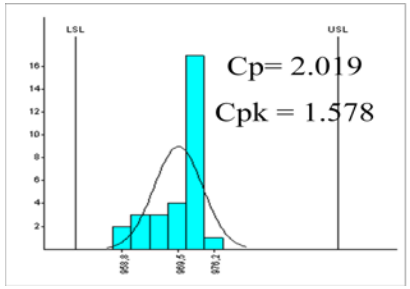
Hole 3 (panjang)

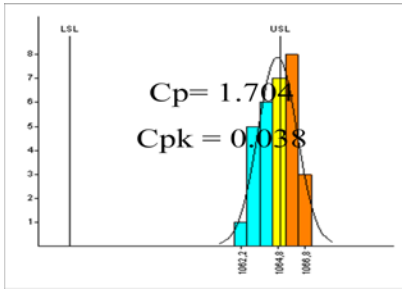


Wide









Hole 2

Hole 4 (length)

Wide

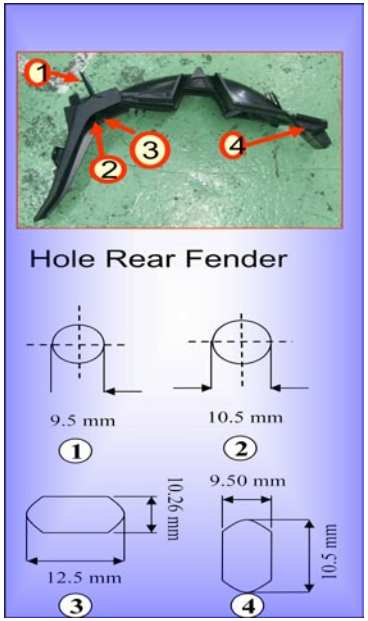
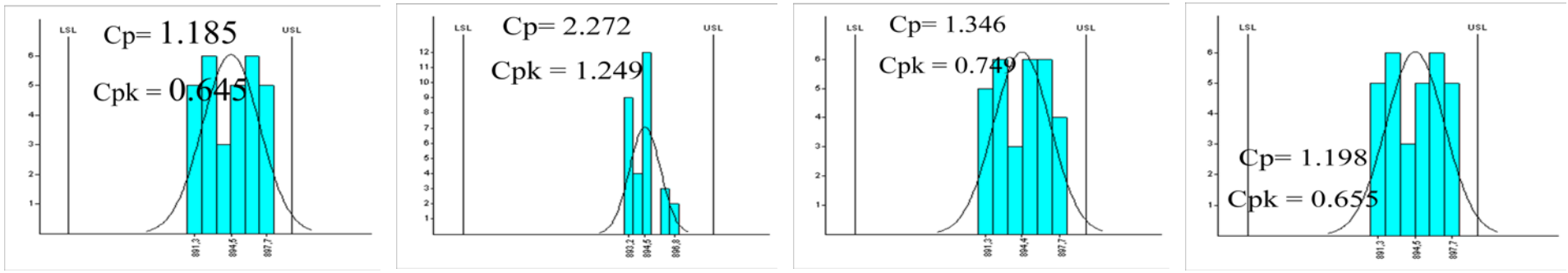


Figure 4: Measure- Stage 1 (Assy Unit) Rear Fender

3.2.2 Measure – Part 2 (Weld 1A) Data Diameter Stay Rear Fender

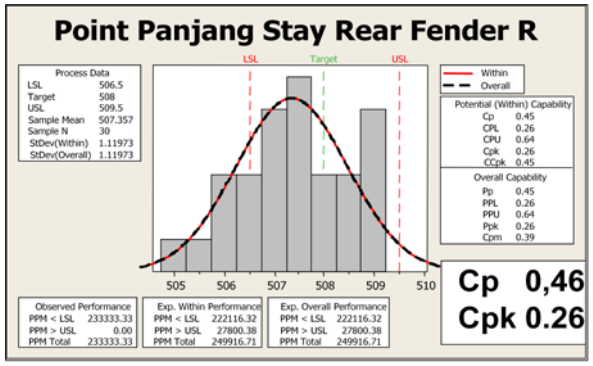


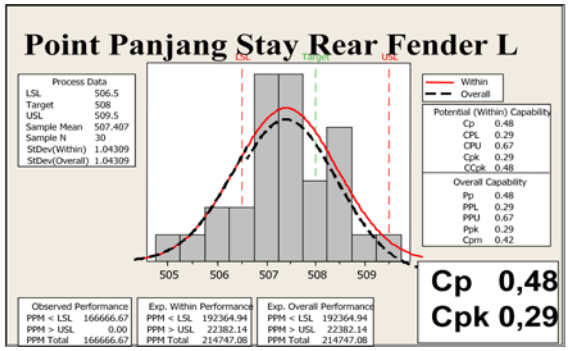
Hole 1 **Hole 2** **Hole 3** **Hole 4**

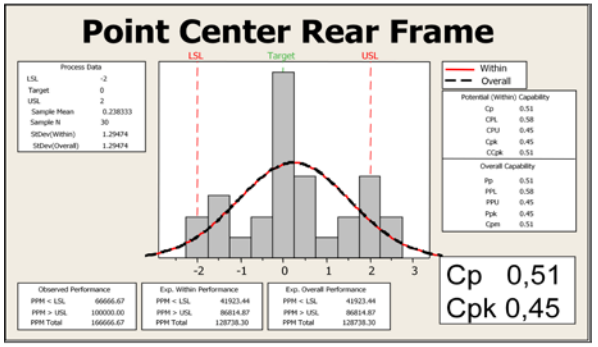
Figure 5: Measure- Phase 2 (Welding) Rear Fender

Rear fender's assembly is begun of hole 1, 2 (round), 3 (oval) and 4. Of datas upon for that Stay Rear Fender's diameter alone was good looked from CP is tall, to Part supporting for Rear Fender extant variation on hole diameter for Rear Fender appears on low CP point

3.2.3 Measure – Phase 3 (welding 1a) Cp/Cpk Analysis







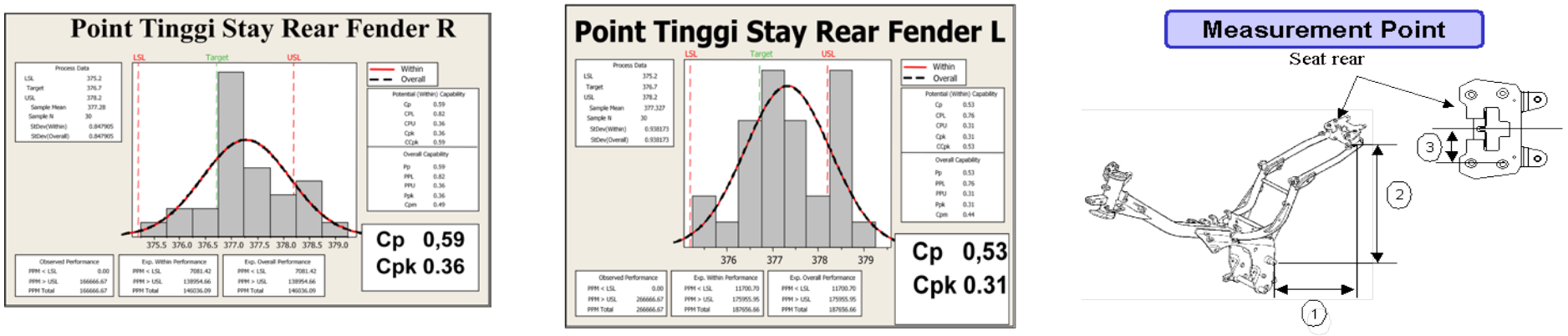


Figure 6: Measure – Phase 3 (Welding) Cp/Cpk Analysis

3.2.4 Measure – Sigma Level & Target

Table 4: Sigma Level & Target

Mount	Production (Unit)	Reject	% Reject
JAN	54950	2422	4.41
FEB	43937	1247	2.84
MAR	39765	487	1.22
APR	53560	1050	1.96
MAY	48630	329	0.68
Total	240842	5535	

3.3 Analysis – Fishbone Diagram

Figure 7: Fishbone Diagram

Rear's moment clamping in rear's moment assembly regard repair rear fender's case Oblique since clamping on can't yet settle position accuracy of rear's moment. Assembly process from rear fender also regard rear fender's case Oblique since part's shifting effect impac which is accepted one rear fender's time is assembled. Fixed up that will be done is as follows: (1) Jig's Moves processes stay rear's moments; (2) repair processes Clamp; (3) part's assembly Method

3.3.1 Setting's Factor by Methodics Simulation (Phase 1)

Simulation trial used: (1) Sample 30 motor units; (2) 30 Arm Swing's units and 30 Body's Frame unit (100% centering/correcting's inputs and jig inspection); (3) assembly's Processes corresponds to operation standards. Its result available 6 RFM'S units (20% sample):

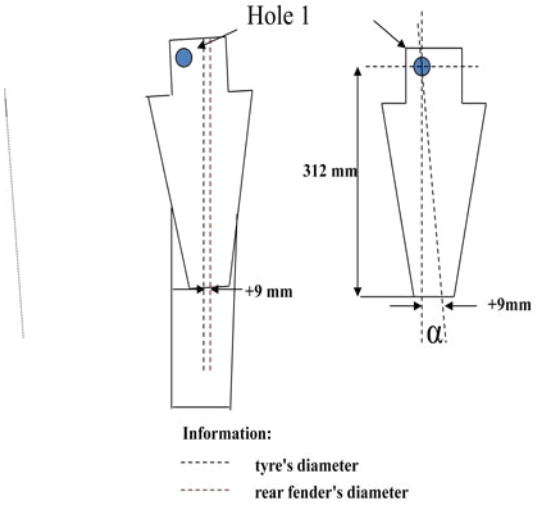
Table 5: Methodics Simulation (Phase 1)

RFM					Repair Action		
Unit Motor	**Setting Chain Adjuster**		**Oblique**	**Status**	**First Method**	**Repair Result**	**Status**
1	R = 2	L = 2	**+ 9 mm**	NG	√	+2	OK
2	R = 2	L = 2	**+ 8 mm**	NG	√	+2	OK
3	R = 2	L = 2	**+ 4 mm**	NG	√	+1	OK
4	R = 2	L = 2	**+ 4 mm**	NG	√	0	OK
5	R = 2	L = 2	**+ 8 mm**	NG	√	+2	OK

6	R = 2	L = 2	**+ 4 mm**	NG	√	+1	OK

3.3.1.1 Setting's Factor Analysis While Rear Fender's Assembly Cause Of RFM

Upon gotten by rear fender oblique with inclination + 9 mm can be caused at the moment assembly rear fender at hole 1, rear fender forms angle to stay fender as big as α :



$$tg\,\alpha = \frac{9mm}{312mm} = 0.0288$$

$$\alpha = tg^{-1}\,0.0288$$

$$\alpha = 1.65°$$

So, with just pivot as big as 1.65°, rear fender can shifting in as much as 9 mm to right.

Figure 7: Rear Fender's Assembly Cause Of RFM

3.3.1.2 Rear Fender's position to Stay Rear Fender On Hole 2 and 3

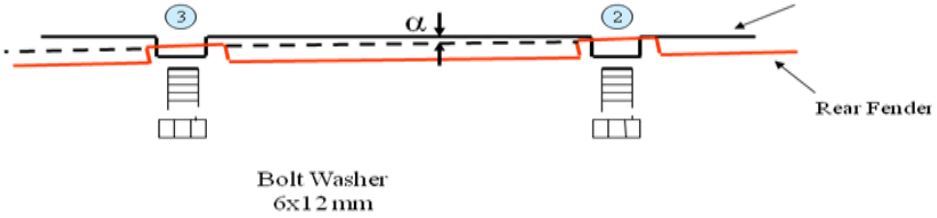


Figure 8: Rear Fender's position to Stay Rear Fender On Hole 2 and 3

On Rear Fender's case Oblique to right as big as 9 mm, corner of that molded as big as 1.65°. rear fender's position to hole 2 and 3 to stay rear fender is as pictured as above. Upon done by bolt washer's assembly, washer will follow oblique rear fender area. Base first phase analysis gets at concludes that setting's factor regard Repair Rear Fender's happening Oblique.

3.3.2 Analysis - Setting's Factor by Methodics Simulation (Phase 2)

Figure 9 :Setting's Factor by Methodics Simulation (Phase 2)

Table 6: Data Sampling Rear Fender Inclination

UNIT MOTOR's	*Rear Fender's inclination*	
	Unit Motor OK	**Unit Motor NG**
1	**+ 1 mm**	+ 9 mm
2	**0**	+ 8 mm
3	**0**	+ 4 mm
4	**0**	+ 4 mm
5	**+ 1 mm**	+ 8 mm
6	**0**	+ 4 mm

3.3.2 Arm Swing's Interchange Result

a. N.G's motorcycle

Disassembly reassembly's point 1 = + 9 mm states: NG

Disassembly reassembly's point 2 = + 10 mm is state: NG

b. OK's motorcycle

Disassembly reassembly's point 1 = 0 mm state: OK

Disassembly reassembly's point 2 = 0 mm is state: OK

Conclusion: No motorcycle unit state change, NG makes a abode NG and regular OK OK

3.3.3 Rear Fender's Interchange Result

a. NG's motorcycle

Result disassembly-reassembly 1 = + 10 mm status : NG

Result disassembly-reassembly 2 = + 11 mm status : NG

b. OK's motorcycle

Result disassembly-reassembly 1 = 0 mm status : OK

Result disassembly-reassembly 2 = 0 mm status : OK

Conclution : No motorcycle unit state change, NG makes a abode NG and regular OK Is OK

3.3.4 Frame Interchange Result Body

a. NG's motorcycle

Result disassembly-reassembly 1 = + 1 mm status : OK

Result disassembly-reassembly 2 = + 2 mm status : OK

b. OK's motorcycle

Result disassembly-reassembly 1 = + 8 mm status : NG

Result disassembly-reassembly 2 = + 9 mm status : NG

Conclution : States changed happening motor unit, NG becomes OK and OK as NG

3.3.5 Determining Rear Fender's Cause Coves

NG's motor:

Arm Swing's afters point is traded : + 10 mm states: NG

Rear Fender's afters point is traded : + 11 mm states: NG

Frame afters point Body is traded : + 2 mm states: OK

OK motor:

Arm Swing's afters point is traded : + 0 mm state: OK

Rear Fender's afters point is traded : + 0 mm state: OK

Frame afters point Body is traded : + 9 mm states: NG

Phase analysis result 2 get to be concluded by Repair Rear Fender's causatives Coves is body's frames

3.4 Analysis – Process Flow (Welding)

Figure 10: Analysis – Process Flow (Welding)

3.5 Improvement Proceces

a. Changing Rear Fender's Assembly Process
b. Move Processes Rear's Moment Assembly From Rear Frame Goes To General Assy
c. Improve Indicator Clamp Jig Processes Rear's Moment (1) Censor Assembly On Pneumatic; (2) Pokayoke's Assembly On Clamping

3.6 Controled

3.6.1 Standard of Assembly Unit

Table 7: Changed Operasional System (OS)

Before	After
OS: 54L0 KTM – 206 - split's pin assembly - bolt flange's assembly 6x12 to hole 1	OS: 54L0 KTM – 206 - split's pin assembly - bolt washer's assembly 6x12 to hole 2 &3
OS: 54L0 KTM – 207 - bolt washer's assembly 6x12 to hole 2&3 - bolt flange's assembly 6x12 to hole 4	OS: 54L0 KTM – 207 - split's pin assembly - bolt flange's assembly 6x12 for hole 4 & 1

3.6.2 Standard of Welding

a. Each production line to process stay rear's moment at migrant at sta general assembled and is made **OS**
b. Rear's moment process on sta general assy and jig processes to be assembled by censor and **pokayoke**
c. Positioning beforehand cheque stay rear's moment before process welding.

Table 8: Result Evaluation

Before	QCD	After
Repair Rear Fender's percentage coves tall With • Full scale reject **5535** Jan's period 07 sd May with production **240842** • PPM ***22982*** sigma is level ***3,5*** Repair Rear Fender Coves January until May 2007 as big as **33,09 %** of Assembly's case	Q	Rear Fender's percentage Coves to be down By • Full scale reject **1443** June period 07 until Okt 07 with full scale production **282548** • PPM ***5107*** Sigma is Level ***4,05*** Repair Rear Fender Coves June until October 2007 as big as **13,43 %** of Assembly's case
Total Cost of Poor Quality	C	Total Cost of Poor Quality

Before	QCD	After
(MhRepair X TotalReject)/ prodplant 1 = (Rp. 2786.5,- X 6652)/329542 = **Rp. 56,15 / unit** ***Full Repair RFM'S Final Year 2006 as much 93683 case units, So COPQ*** = Full scale Reject x MH Repair = 93683 Unit x Rp 2786.5,- = **Rp 261.044.507,-**		=(Mh Repair X Total Reject)/prod plant 1 =(Rp.2786.5,-X348)/342863=**Rp. 2,88/ unit** **Saving Cost** = Rp. 56,25/unit- Rp. 2,83/unit**= 53,27/unit** ***Total Repair Final RFM Tahun 2007 sebanyak 7000 unit kasus, Jadi COPQ*** = Total Reject X MH Repair = 7000 UnitXRp 2786.5,- = **Rp 19.505.263,-** **Saving Cost/years** = Rp. 261.044.507-Rp. 19.505.263 **= Rp 241.539.244,-**
Delivery Scan In is constrained effect repair Rear Fender	D	Repair Rear Fender goes down, more delivery smooth

4. Conclution

1. Phase 1: Setting' s factor regard Repair Rear Fender' s happening Oblique; Phase 2: Phase analysis result 2 get to be concluded by Repair Rear Fender's causatives Coves is body's frames
2. For NG's motor: (1) Arm Swing's afters Point is traded: + 10 mm states: NG; (2) Rear Fender's afters Point is traded: + 11 mm states: NG and (3) Frame afters Points Body is traded: + 2 mm states: OK meanwhile For motor OK (1) Arm Swing's afters Point is traded: + 0 mm with state: OK; (2) Rear Fender's afters Point is traded: + 0 mm with state: OK; (3) Frame afters Points Body is traded: + 9 mm states: NG. base explanation upon can conclude repair rear Fender's cause Oblique is body's frame
3. Rear Fender's percentage Oblique to be down By Total reject 1443 June period 07 until. Okt 07 by total productions 282548 , PPM *5107* , Sigma is Level *4,05* . Repair Rear Fender Oblique June until October 2007 as big as 13,43 % of Assembly's case
4. Full scale Cost Of Poor Quality = (Mh Repair x Total Reject)/prod plant 1 → (Rp. 2786. 5,- X 348)/342863 = Rp. 2,88 / units. Saving Cost = Rp. 56,25 / Rp's units. 2,83 / units = 53,27/units
5. *Full scale Repair RFM'S Final Year 2007 as much 7000 case units, So COPQ*=Full scale Reject x MH Repair =7000 Unit x Rp 2786.5,- = Rp 19.505.263,- Saving Cost per year n= Rp. 261. 044. 507 Rp. 19. 505. 263 = Rp 241.539.244,-

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TEST PERFORM PUMPS *PERIPHERAL* WITH IMPELLER'S SHAPED MODIFICATION

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Abstract

For the moment to meet the need fresh water at family a lot of utilize motor vigorous water pump electric to raise water from within well wend penampung's tank water. One of pump type that there are many is chosen is peripheral pump or often been called even with turbine pump or regenerative pump. Peripheral pump is centrifugal pump that impellernya has sudu sudu radial in number a lot of around 18 until 48 sudu. This pump so practical, pocket edition with head high but then this pump have low efficiency, no more than 50 %.

Lazarkiewics (1965), presenting characteristic graph one peripheral's pump, covering relationship among debit with efficiency, head and axis energy, where is ranging maximum efficiency among 45 % 50 %. Hongwei (1996), making impeller's shaped modification as much 4 numbers intent to get characteristic curve energis of inferior pump and debit energy curve that evenly so if pumps to be run on changed streaming debit seccara kontinu, changing happening energy weeny. Dequan Yu (1998), doing peripheral's pump research to pump fuel, intent to get impeller's model that can reduce turbulensi in housing pumps fuel so sublimate get to be reduced. Dequan Yu (2001), doing peripheral's pump research to get model impeller that don't noisy, gotten by impeller's result with diameter 38 mm and having 47 sudu on every flanks so effective reduces noise.

To increase the performance of a pump one of its by does impeller's modification pumps that. In this research is made 6 numbers impeller by totals number of blades are 40, one impeller has to form as as impeller original of pump, meanwhile five numbers impeller constitutes to modify from standard forms. impeller's blade standard form out of wind and rigged not one lining. Impeller modifies impeller blade straight and one lining, modification II. Impeller blade is canted to the fore 75^{0} , sudu impeller's III. modification is canted 75^{0} backward, modification IV. sudu impeller is canted 60^{0} forwards, and modification v impeller blade is canted 60^{0} backward. Method observationaling to follow standard method to get the performance of one pump. In efficiencies acquired research supreme be from impeller modifies, which is impeller with blade out of wind and one lining.

Key word: Perform, Peripheral Pump, impeller

1. Introduction

Fresh water requirement for man life and also for industry need ever increasing. So medium requirement will water pump also ever increasing. For the moment at marketing was available miscellaneous water pump which moved by electricity motor in various merk and measure. Each pump has unjuk job that variably, so consumer gets to choose pump type corresponds to its requirement. Research aims to get unjuk best job of many modification forms *impeller* one *peripheral pump.* This observational benefit is subject to be get impeller's form design one *peripheral pump* that have unjuk best job.

2. Theory

Lazarkievicz (1965), featuring characteristic graph one *peripheral pump* , one that figure anatara's relationship debit with head, energy and efficiency.

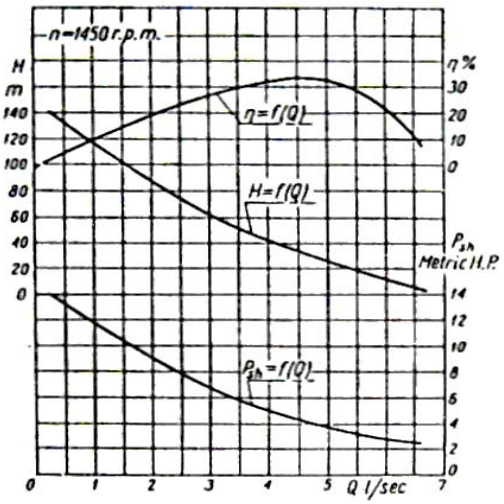


Figure 1. Characteristic Graph *peripheral pump* (Hongwei Sun, 1996)

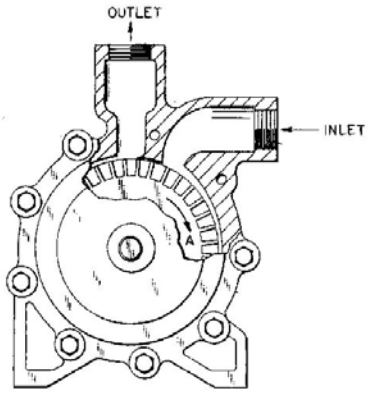


Figure 2. Form *impeller* early *peripheral pump* (Lazarkiewicz, 1965)

Hongwei Sun (1996), doing research *peripheral pump* to get low energy curve. In a general way *peripheral pump* needing greater energy if dwindling debit (figure 1). *Peripheral pump* with curve energis to cove to its debit less appropriate if is run on changed debit kontinyu's ala. Research aims to get energy curve of inferior pump and debit energy curve that evenly so if pumps to be run on changed streaming debit kontinyu's ala, changing happening energy weeny.

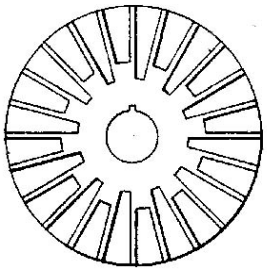


Figure 3. Form *impeller* alternate quiz *impeller* long sudu (Hongwei Sun, 1996)

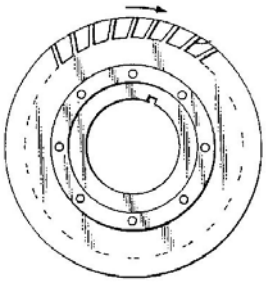


Figure 4. Form *impeller* sudu is canted (Hongwei Sun, 1996)

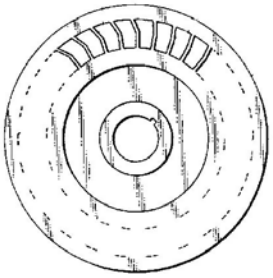


Figure 5. Form *impeller* long sudu sudu is bent (Hongwei Sun, 1996)

Base examination result is gotten forms *impeller* with sudu is canted (image 4) having more characteristic curve landai from impeller standard. Examination result *impeller is novel* (image 6) gotten by head's characteristic curve debit that evenly.

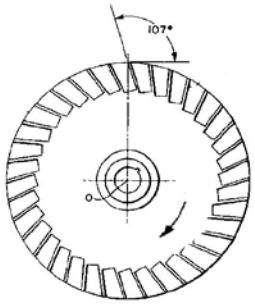


Figure 6: Form *novel impeller* Before Modification

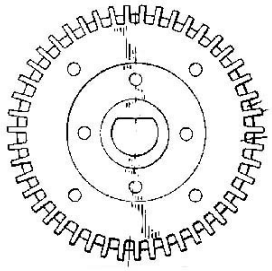


Figure 7. Form *impeller* Modificated (Dequan Yu, 2001)

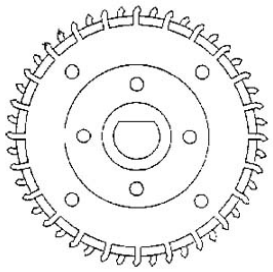


Figure 8. Form *impeller* (Hongwei Sun, 1996)

Dequan Yu (2001), doing research *peripheral pump* to get model *impeller* that don't whoop it up. Image 9, are shaped modification which be done, *impeller* this have different sudu formation of *impeller* standard, which is on sudu fore and the back ungraded equal but forms angle ?? . According to Dequan Yu, impeller with diameter 38 mm and having 47 sudu on every flank will so effective in reduce noise if corner of among sudu *impeller* front and the back well worth 4 degrees.

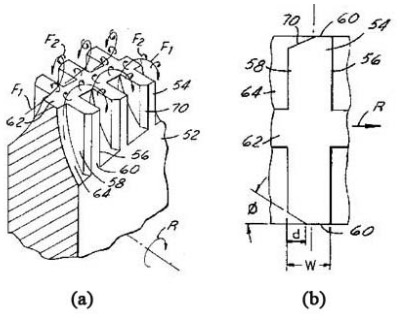


Figure 9. Form *impeller* modification pump (Dequan Yu, 2001)

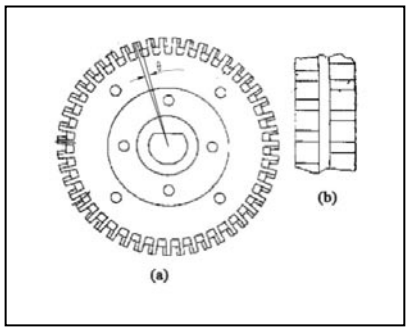


Figure 10. Form sudu *impeller chamfer* pump fuel (Dequan Yu, 1998)

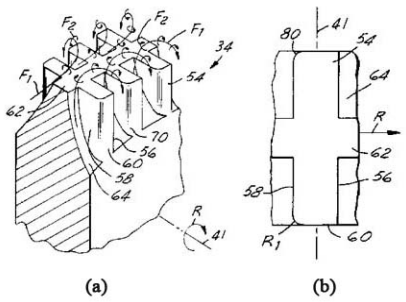


Figure 11. Form *impeller radius* Fuel pump laterally inclined

(a) method *chamfer* (Dequan Yu, 1998)

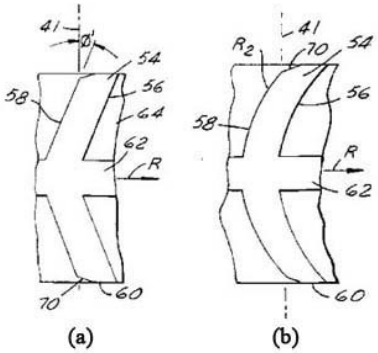


Figure 12. Form sudu *impeller* oblique (b) method *radius* (Dequan Yu, 1998)

Dequan Yu (1998), doing research *peripheral pump* to pump fuel on motor vehicle. There is weakness on *peripheral pump* , which is arises sizable turbulensi it so will down efficiency and also arises it kavitasi arising out fuel sublimate. This research bertjuan to get model *impeller* one that gets to reduce turbulan indoor pump so sublimate gets to be reduced and pump efficiency increases.

3. Research Methodology

This research is made for modification six numbers *impeller peripheral pump* one that made from material *nylon*. Each impeller ala alternates to be assembled on house pumps then done by examination. Examination did by makes water debit variation, will get head's data variation that resulting and energy required just for move that pump, then is featured deep shaped characteristic graph.

Figure 13. Form *impeller* 1

Figure 14. Form *impeller* 2

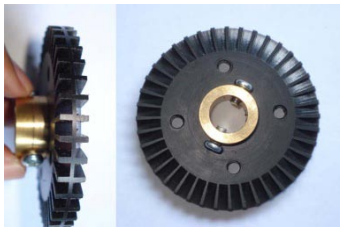


Figure 15. Form *impeller* 3

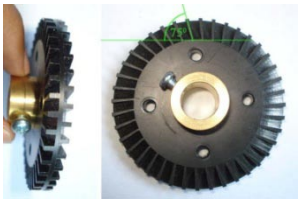


Figure 16. Form *impeller* 4

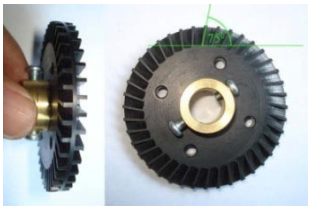


Figure 17. Form *impeller* 5

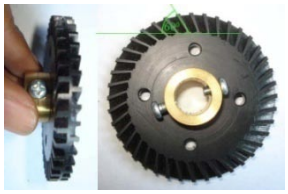


Figure 18. Form *impeller* 6

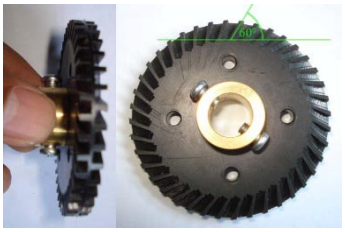


Figure 19. Form *impeller* 7

Information :

Impeller 1: *impeller* standard constitutes deliverance original pump, sudu is straight by totals 41 numbers

Impeller 2: *impeller* brand by designs to equal standard form, total sudu 40 numbers

Impeller 3: *impeller* modification, sudu is straight, sudu is front and the back one lining, total sudu 40 numbers

Impeller 4: *impeller* modification, sudu is tilted back as big as 75^0, total sudu 40 numbers

Impeller 5: *impeller* modification, sudu is tilted forward as big as 75^0, total sudu 40 numbers

Impeller 6: *impeller* modification, sudu is tilted back as big as 60 ^{0}, total sudu 40 numbers

Impeller 7: *impeller* modification, sudu is tilted forward as big as 60 ^{0}, total sudu 40 numbers

4. Result and study

Presented observational result deep shaped karateristik's graph as follows:

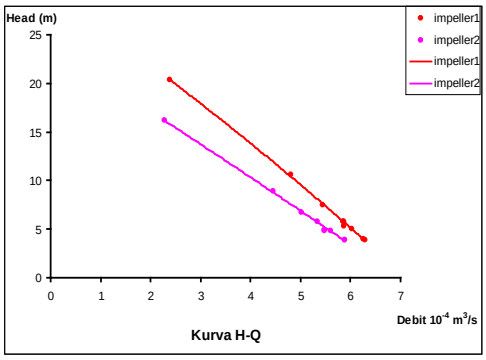


Figure 20. Graph H-Q impeller 1 and 2

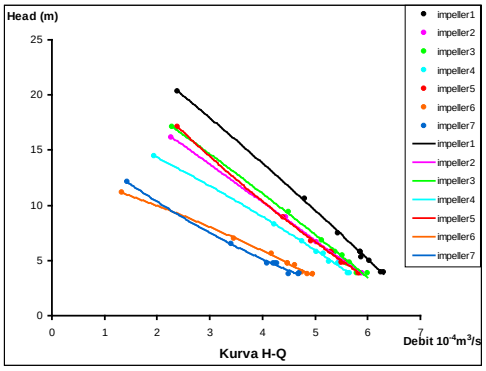


Figure 21. Graph H-Q impeller1 until 7

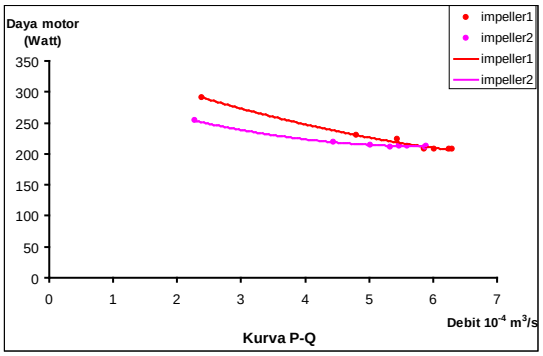


Figure 22. Graph P-Q impeller 1 and 2

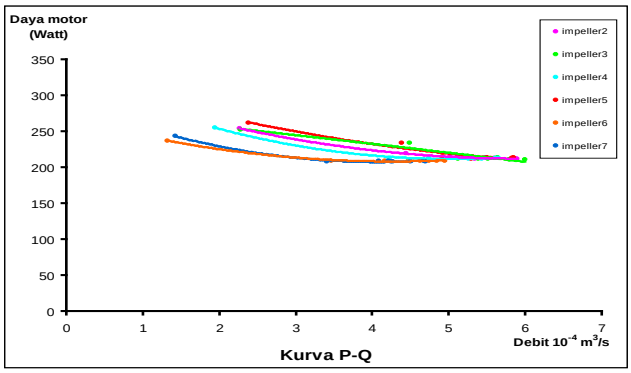


Figure 23. Graph P-Q impeller 2 until 7

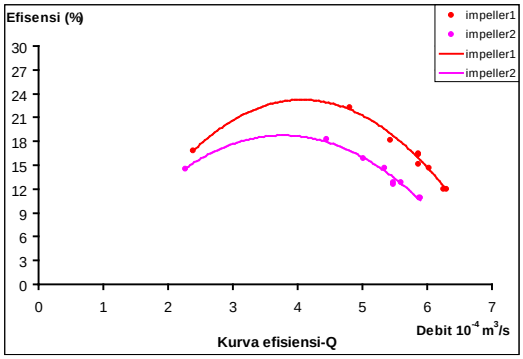
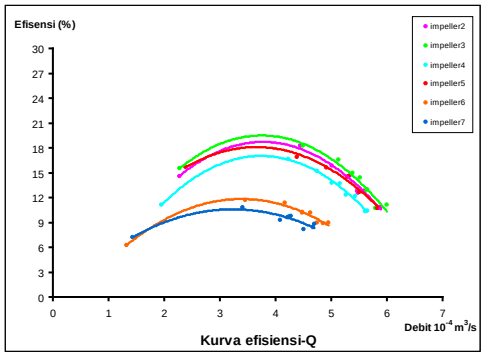


Figure 24. Graph efisiensi impeller 1 and 2



Graph 25. Grafik efisiensi impeller 2 until 7

From image 20, impeller 1 still more superior from impeller 2, it because marks sense handicap in processes makings so on impeller 2 just is formed 40 sudu, meanwhile on impeller 1 has 41 sudu, also subtracted presisinya impeller's makings modifies, so happening leakage among impeller and pump wall is even greater. Of image 21, for impeller to modify therefore impeller 3 has unjuk best jobs. Of image 22, impeller 2 have more graph across being appealed impeller 1. Of pictured 24, impeller's efficiency 2 still inferior appealed by impeller 1, it because accuracy problem in impeller's makings. From gambar25, impeller 3 have best efficiencies than impeller is another modifications.

5. Conclusion

From characteristic graph all impeller that at quiz can take conclusion as follows:

a. Impeller modifies that have unjuk best job of yielding observational is impeller 3.
b. Impeller modifies that have unjuk job most bad of research result is impeller 7.

6. Reference

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TECHNOLOGY CONCEPTS FOR LONG ENDURANCE UNMANNED AERIAL VEHICLE

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Abstract

UAV became widely used in military and civil purpose. In the earlier years, UAV only support the military activity. In last 20 years UAV had been apply to civil and scientific purpose. Reconnaissance and surveillance were the type of missions of UAV that both military and civil desired. These types of missions could cover several of military requirements and almost all of civil requirements. UAV categories that could cover this mission was UAV with Long Endurance capabilities.

Improving capabilities of current UAV was important to get more efficient and economics UAV Systems. Mature of new technologies give advantage in this vehicle development. New technology not only applied on air vehicle element of UAV System, but also should be applied to other element like environment element, mission control element, payload element, and support element.

New technology should have capabilities to make the UAV system safer, more secure, efficient, and environmental friendly. These new technologies also should enable to increase capabilities of UAV system revolutionary. Creation new novel of technology concepts would support science mission and terrestrial applications

Keywords : UAV, design concept, long endurance flight

9 Introduction

Advantages of using UAV were its ability to do mission that categorized as “the dull, the dirty, and the dangerous.” Due to its vantage point and multiple sensors, one hovering unmanned sentry could cover the same area as ten (or more) human sentries (“the dull”). The threat of nuclear, biological, or chemical (NBC) attacks needed to conduct operations in their aftermath. UAVs could reconnoiter contaminated areas without risk to human life1 (“the dirty”). In a climate more demanding of lossless engagement, UAVs can assume the riskier missions and prosecute the most heavily defended targets. Unaccompanied combat UAVs (UCAVs) could perform the high-risk suppression of enemy air defenses (“the dangerous”). In such a role, UAVs would be potent force multipliers, directly releasing aircraft for other sorties. Although there were many of UAVs possible mission, the most common mission of UAV were surveillance and reconnaissance. To meet better capabilities to do this mission, UAV should have some attributes that had closely support surveillance and reconnaissance mission. One of the attribute was long endurance capability.

10 UAV System

UAV System was the system which not only the air vehicle (airframe) but also include whole element that correlated to the airframe element to perform mission. The other elements were: environment element, mission control element, payload element and support element. Environment element was the environment in which airframe operate. Environment element includes the airspace, the data link, relay aircraft, etc.

All of UAV system elements must be concerned to make better UAV, not only for technical aspect, but also for economic, utilities and safety aspect. Table 1 shows the attribute that UAV System should have. Affordability would be the most concerned aspect in developing UAV, especially for civil application. For technical aspect, advances must occur in three general areas: reliability, survivability, and autonomy. All of these attributes hinge on technology.

Table 1. Attributes for the next Unmanned Aerial Vehicle [1]

Affordability		Performance	Safety	Readiness
Acquisition Cost	Operations Cost			
Airframe Payloads Ground Control Communications	Crew Training Infrastructure Maintenance Spares Logistic Support Operations Concept	Payload Capability Endurance Speed Altitude	Airworthiness Redundancy Emergency Operation Reliability ATC Integration	Inherent Availability Maintainability Reliability Logistic Support Weather Operation

11 UAV Systems Technologies

New technology should have capabilities to make the UAV system safer, more secure, efficient, and environmental friendly. These new technologies also should enable to increase capabilities of UAV system revolutionary. Creation new novel of technology concepts would support science mission and terrestrial applications

To make the UAV safer, technology should be focused on aircraft self-protection and preservation. With this technology, aircraft would be protected and prevented from damage due to abnormal operations and system failure. Human error avoidance and mitigation should be focused to prevent unsafe flight situation due to breakdown between human and aircraft.

Environmental friendly UAV would make better airspace for human life. New engine development to get low emission while maintaining high performance and reliability. New energy sources investigations and develops intelligent management techniques for zero emissions and enable new cleaner vehicle concept for new science missions. Engine and airframe noise reduction technology should be develops to protect the environment.

Next generation of surveillance and reconnaissance should have time on station as long as possible. NASA develops solar powered UAV-Helios to achieve long time endurance for months. To realize ability to fly in long time on station need a lot of technologies improvement, not only for airframe but also for mission control and payload system.

12 Airframe Technologies

12.1 Aerodynamics

To increase endurance time, airframe should have high lift over drag ratio. Increasing lift over drag ratio could be achieve using several efforts such as modified airframe aerodynamics configuration, using flow control device, and advanced wing design.

Airframe configuration tends to eliminate empennage of airplane. Blended wing body configuration was today's alternative for large commercial aircraft (Figure 1). This configuration could increase lift over drag ratio until 30%. UAV could adopt his technology to increase lift over drag ratio. Helios use flying wing configuration, to get drag reduction while there was no tail (Figure 2). Flying wing configuration could increase lift over drag ratio until 15%. Disadvantage of this configuration was maneuver control problem that occur when there was no tail to control lateral directional movement. To cover this problem several alternative had been proposed. Multi engine control was the most popular.

Figure 1. Blended wing body aircraft configuration [3]

Figure 2 Solar powered UAV – Helios [3]

Flow control device designed to increase laminar flow area over the wing. Using this technique wing drag could reduce until 5%. But device complexity made this equipment rather difficult to apply into UAV. To get similar effect of flow laminarity, design of laminar airfoil would be give some advantage, when UAV fly in low speed to do surveillance and reconnaissance mission.

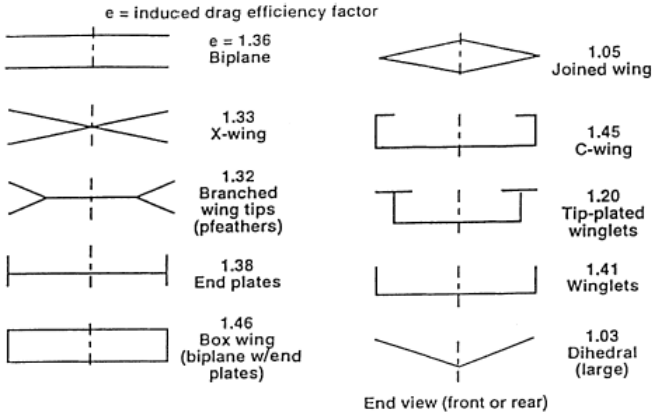

Figure 3 Teoriotical value of induced drag efficiency for various non planar wing configuration [7]

Advanced wing design was include design of wingtip design and wing planform. Today wingtip device could increase lift over drag ratio until 50% when winggrid type wingtip apply in wing tip. This method was difficult to apply for small size UAV, because wing tip was too small. Non planar wing planform were the new concept to get high wing efficiency factor due to induced drag. Figure 3 shows the efficiency factor hat could be reach by this non planar wing configurations.

12.2 Propulsions

Endurance is driven by propulsion, both in terms of system efficiency (i.e., specific fuel consumption (SFC) or, for batteries and fuel cells, specific energy) and performance per unit mass (mass specific power, or MSP). SFC is the amount of fuel burned per time for the amount of power delivered by a combustion engine (i.e., pound (fuel)/hour/pound (thrust)). MSP is the ratio of the power delivered to the weight of the engine/battery/fuel cell (i.e., horsepower/pound).

Figure 4 shows a threefold improvement in SFC has occurred from 1955 to the present day for the two dominant types of combustion engines: gas turbines (jet engines) and internal combustion engines (ICEs). Another 60 percent improvement in gas turbine SFC and 30 percent in ICE SFC should be realizable by 2025. These improvements translate directly into endurance, and therefore coverage, increases.

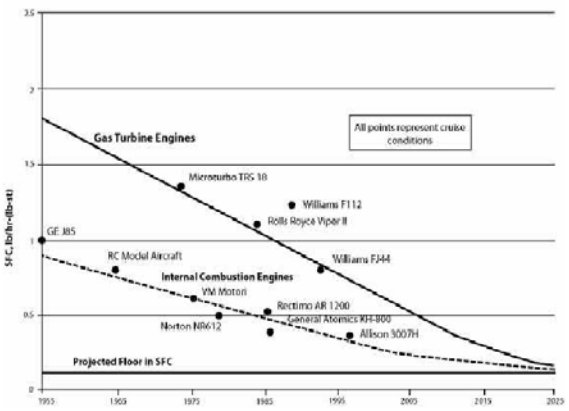

Figure 4 Specific fuel consumption trends [6]

Three types of electrical propulsion systems are available for UAVs: batteries, fuel cells, and solar cells. Specific energy is the amount of energy a battery or fuel cell stores per unit mass, usually measured in watt-hours per kilogram (hp-hours per lb). Higher specific energies lead to batteries with increased lifespan, which would lead to battery-powered aircraft with increased range and endurance.

Solar energy is a viable option for other types of UAVs, including high-altitude, long endurance UAVs, either for reconnaissance or for airborne communications relays. While storage of solar energy for use during foul weather or night conditions is a possibility, the added weight of these storage systems probably make them prohibitive for use on micro air vehicles and combat UAVs.

12.3 Structure

To perform long endurance, the UAV airframe should have low structural weight. All composite materials applied to make lighter UAV structure. Optimization of fiber orientation was needed to get the thinnest composite thickness and lowest weight at the appropriate structure load. Using of commercial materials instead of exotic materials would make this UAV production cost lesser. Even though this would make UAV structure had additional weight, but its cover with a good design of composite fabric orientation.

New concept of inflatable wing was already tested and perform well for air deployed UAV. This concept offer light and flexible structure. Combine this concept with composite material and lither than air vehicle, could made very light structure.

12.4 Avionic

All avionic and electronic system used the general coding system, so the system will compatible with all payloads that would be installed. Low power electronic equipment used to reduce the system power required, without any significant effect in range of radio transmitter coverage.

Standardization of avionics system was started. Interoperability for some type of UAV would made the system more efficient and economics

12.5 Mission Control Technologies

Laptop size mission control was the target of all designers. With this size mission control could be transport to everywhere for increasing mission complexity. Figure 5 show trends of mission control size.

Interoperability for mission control and communication system would make the system compatible with a lot of UAV type.

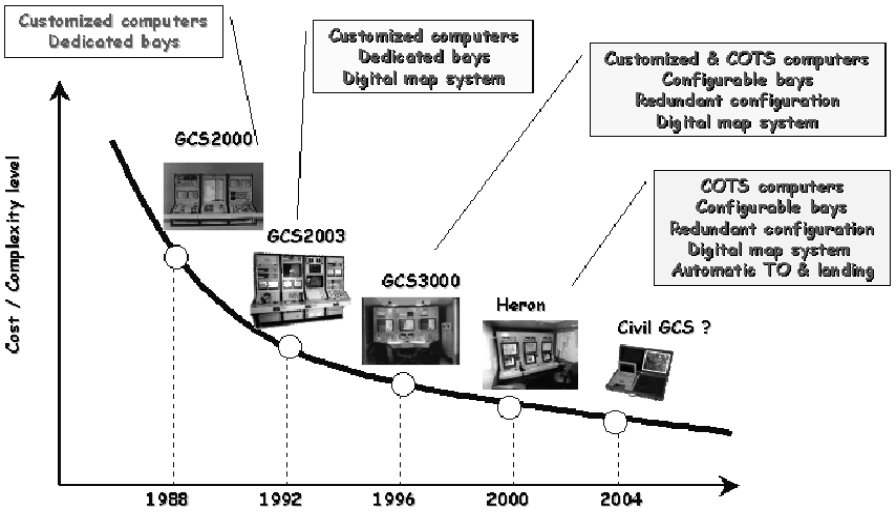

Figure 5. Mission Control trends [6]

12.6 Payload and Sensor Technology

The requirements for various payload capabilities could be grouped into six functional areas: imagery intelligence (IMINT), signals intelligence (SIGINT), measurement and signatures intelligence (MASINT), communications, munitions and meteorological. Figure 6 shows payload requirements.

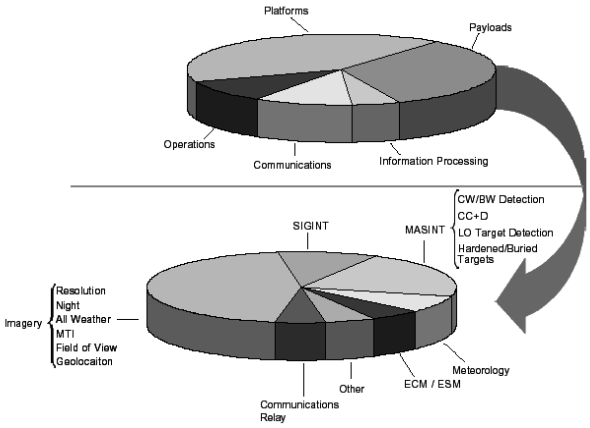

Figure 6 UAV Payload requirements [6]

The ability to detect, recognize, classify, and identify targets is the key UAV payload requirement. One solution translates to obtaining improved sensor resolution from technology advances. Another possible solution would require an architectural change to reconnaissance and surveillance by relying instead on micro air vehicles to obtain close-in imagery using modest sensors. Resolution in electro-optical/infrared (EO/IR) sensors is most commonly measured in terms of ground resolved distance (GRD), the minimum separation between two distinguishable objects. Whereas GRD is a function of range, instantaneous field of view (IFOV), the smallest angle a sensor can resolve, is not. Synthetic aperture radar (SAR) uses impulse response (IPR) as its measure of resolution. Finally, the interpretability of a given image, a subjective measure of its usefulness assigned by an image analyst,

is rated on the National Imagery Interpretability Rating Scale (NIIRS) for visible and infrared (IR) (passive) imagery and on the National Radar Interpretability Scale (NRIS) for SAR (active) imagery.

As EO sensors are nearing the theoretical limits in achievable array size and pixel pitch, they will rely increasingly on evolutionary advancements in other areas of technology to increase resolution. Examples of emerging technologies for imaging systems include uncooled IR sensors, microelectro-mechanical systems (MEMS), new detector materials and better fabrication techniques, and multiple aperture optical systems. In the next few years, it is predicted that uncooled sensors will approximate the performance of their cooled counterparts while at the same time lowering costs, increasing reliability, reducing power requirements, and allowing for more compact packaging. The commercial sector is pushing applications in rifle sights and driver's viewers, while the military is focusing on applications in threat warning, long-range targeting, and unattended ground sensors. MEMS will enable the next generation of lithography for manufacturing focal plane arrays characterized by reduced pixel sizes, high fill-factors, and analog-to-digital converters on a single wafer chip, while offering increased reliability by replacing mechanical parts. A better understanding of the material characteristics of detectors, specifically Vanadium Oxide (VOx), amorphous silicon, and Barium Strontium Titanium (BST) used in uncooled LWIR detectors, and fabrication techniques of thin pixels will enable improved thermal responsivity and lower read-out noise. One of the most promising areas of optics technology development is multiple aperture optical systems. The potential increase in resolution offered by such systems would be revolutionary. The benefits of multiple apertures have been demonstrated in the RF bands and in astronomical telescopes, but it is a long-term concept in tactical optical systems using visible and IR bands.

13 Conclusion

Apply new technology would make the UAV do the mission more effective, efficient and economics. However applying new technology should proof that the new technology was had good reliability, survivability, and autonomy.

Smooth and clean aerodynamics configuration apply to long endurance to increase lift over drag ratio. With increasing this value until 30% range also could be increased until 30% for the same engine and structural weight (Brequet's equation).

New engine with lower specific fuel consumption and high thrust over weight ratio, could reduce fuel required for same mission endurance. In the other hand, with same fuel capacity UAV could fly longer.

Light weight structure using composite material and advanced structural architecture would apply. Thick aerofoil and simple geometry apply to increase inertia, decrease structural thickness, and simplified manufacturing process.

High resolution EO/IR and multi-spectral sensor installed to increase data quality and get detail information for object.

Interoperability system would apply to connect and communicate with other UAV or base for joint data collection.

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THE USE OF FACEBOOK FOR INSTRUCTIONAL, IS IT POSSIBLE?

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Abstract

It is a common known that social network services focus on building online communities of people who share interests and activities, or who are interested in exploring the interests and activities of others. Social networking has created powerful new ways for people to communicate and share information. Social networking websites are being used regularly by millions of people, and it now seems that social networking will be an enduring part of everyday life. Facebook is an online social network software application used by university students to articulate existing offline social connections as well as forge new ones. This paper discusses the possible use of Facebook for instructional. Hopefully, by implementing Facebook for intructional, it may allow instructors to get to know their students better, as well as to allow for more student-to-student interactions.

Keywords: Facebook, social network, instructional

Introduction

Among a number of services available on internet, which nowadays tend to be very widely used by people to perform activities of communication, is a form of social network services. One of the social network services programs for internet-based is *Facebook* which focused on efforts of building online community of those who would like to share some interesting experiences or daily activities. Mark Zuckerberg, a Harvard University student as well as creator and developer of *Facebook*, initially aimed *Facebook* as means to get to know each other among Harvard University students without having to meet in person. Through this social network service people can express themselves, communicate with friends or business partners, and also expand the networking by inviting or getting invited in friendships. *Facebook* describes itself as a "social utility that connects people with friends and others who work, study and live around them" (*Facebook*, 2008). *Facebook* also equips with bulletin boards, instant messaging, email, and the ability to post videos and pictures. There are a number of benefits in virtual communication, in accordance with the characteristics of the virtual world itself, among them are: quick, easy, communication can be done in real and unreal time, in an individual or group and in various amount and types of text, voice, and picture messages or even combination of those three.

Seeing on the above characteristics of *Facebook* and the rapid grow of social network services, could be possible *Facebook* to be used for instructional? This paper will explain on the advantages of *Facebook* among other social network services and some studies on *Facebook* which is being used in academic as well as steps that have to be prepared in using media *Facebook* for instructional.

Benefits on *Facebook*

Referring to Team Cyber (2009) there are a number of benefits on *Facebook* among other social networks:

- Data on *Facebook* profile have to be real data as personal press release to gain larger network;
- *Facebook* can be easily accessed on personal computer (PC), laptop, smartphone with internet connection;
- Photo tag to make people connected. People often use this facility to find their old friends and get connected;
- *Facebook* updating is easier because the notification from friends from the first time they log in. This notification gets people to know in '*accept friend'* or in *wall* messages, etc;
- Alert can show people others registered email address;
- *Facebook* facilitates online chatting one to one or conference;
- People can make *Facebook* group as the way they like. *Facebook* groups are usually groups of hobby, school mates, work mates, and many more. This facility is beneficial in making conversation topic to quality talk;
- *Wall-to-wall* is public message writing activity to friend's *Facebook* front page to make good impressions;
- People can send message in limited way. There are three categories in sending messages in *Facebook*: send to one-to-one, group members, admin, and conference;
- Organize meeting in '*create event*' and invite selected friends to join the event. In this feature invited friends will get three choices to '*attending*', '*maybe attending*', or 'not *attending*'. Other invited friends could see the list of attending, maybe attending, or not attending;
- *Facebook* make you possible to find friends from their emails, names, schools, or other information;
- People can find their old friends through *People You May Know* feature;

- People can know their friends' birthday or events they attending on *Events* and *Birthdays* feature;
- People can invite friends easily by entering their email address in search box;
- People can promote their networking in *application* feature. This feature usually is used to campaign and social activities, advertising, charity, game, and many more.
- *Facebook* can be obtained as personal press release, especially in giving democracy of interpersonal relationship with *profile* menu and sub-menu *info*.
- *Facebook* is a micro-blogging through updating status. This also obtains personal press release towards people daily activities which updated live. If people update their personal information, such as mood situation or how people feel, it make they get closer with their friends who comments on the status update. Comments can be giving advices and support on each other.
- Others features of *Facebook* are always developed to make larger space for people to be creative and innovative in making personal press release or promoting themselves.

Based on those benefits of *Facebook* above, is it possible for *Facebook* to be used for instructional? Obviously, if *Facebook* is used for instructional so there is a network that connects among students and will indirectly create a learning community – a vital component of student education (Baker, 1999).

Facebook provides students opportunities to help and support one to another by either building their course group or joining established groups made by their friends. *Facebook* also increases both teacher-student and student-student interactions in the form of web-based communication. *Facebook* helps instructors get more connected with their students on distributing assignments, upcoming events, useful links, and samples of work outside classrooms. Students can also use *Facebook* to contact to classmates on discussion about class assignments or examinations as well as to collaborate on doing assignments and group projects in online environment. Building the face-to-face and teacher-student relationship, social networks allow students to glimpse instructor profiles containing their personal information, interests, background, and "friends," which can enhance students' motivation, affective learning, and classroom climate (see Mazer et al., 2007). Other scholars, however, find that instructor presence on *Facebook* has neither a positive nor a negative effect on student ratings (i.e., likeability and respect) of professors (Hewitt & Forte 2006).

Research on *Facebook* and Instructional

Several research findings have shown an increasing use of *Facebook* in instructional. According to Stutzman (2006) the existing academic research on *Facebook* has focused on identity presentation and privacy concerns or analysis of the network structure (Hamatake et al., 2005). A 2005 survey of academic community members found that 90% of the undergraduates participated in a social network community, primarily *Facebook*, *MySpace*, and *Friendster*, and that many of them disclosed personal information such as email address (Stutzman, 2006). In her ethnographic work examining self-presentation and social connections among Friendster users, Boyd (2004) notes that users have a variety of motivations for using the site, including connecting with old friends, meeting new acquaintances, dating, and furthering professional networks. *Facebook* has quickly become the social network site of choice by college students and an integral part of the "behind the scenes" college experience (Selwyn, 2007). The adoption rates of *Facebook* in universities and colleges are remarkable; 85% of college students that have a college network within *Facebook* have adopted it (Arrington, 2005). Furthermore, *Facebook* also has a growing audience in perspective teachers' high school and middle school students. To illustrate, registration for individuals age 12-17 grew by 149% between May 2006 and May 2007 (Lipsman, 2007) and a 2007 Pew Internet and American Life Project study found that 55% of 12-17 were using social networking sites (Lenhart & Madden, 2007). Not only are many teens registered on social networking sites, but they are also very active users. The 2007 Pew Internet and American Life study found that "48% of teens visit social networking websites daily or more often; 26% visit once a day, and 22% visit several times a day" (Lenhart & Madden, 2007).

Two-thirds of students surveyed in one study were "comfortable" with faculty on *Facebook* (Hewitt & Forte, 2006) and another study found that 39% of college students surveyed wanted regular on-line discussions with faculty (Fischman, 2008). A study done by Susilo (2008) on distance learning student found out that the potential use of *Facebook* for distance learning is greatest. There was a strong feeling from distance leaning students that they wanted a safe, private space to communicate. They were happy for tutors to be involved because they saw this space as having a specific course purpose. Meanwhile, Caroline and Towner (2009), notes that utilizing *Facebook* effectively in teacher education courses will help facilitate perspective teachers to model what they have learned in their own classrooms. Teacher educators should have students implement *Facebook* in a currently taught course, focusing on integrating course content and objectives. When implementing *Facebook*, pre-service teachers must

consider a pedagogical rational for using *Facebook* as well as suggested course applications. To further identify real and potential issues when using *Facebook*, teacher educators can assign articles about the educational uses of *Facebook*. Then, drawing from their personal experience with *Facebook* and the readings, pre-service students can reflect about *Facebook* as an educational tool in the classroom or an a course blog.

Steps to Use *Facebook* for Instructional

According to Caroline and Towner (2009), there are steps of use *Facebook* as instructional. First, an instructor should create an additional *Facebook* profile for professional use only. The professional use *Facebook* should contain contact information, especially an email address, office address, and phone number. Second, to connect with students, instructors must inform students that they have a *Facebook* profile for a special groups or class or subject. Then, instructors can simply list the web link to their *Facebook* profile in their course syllabus, email signatures or other course management software.
Third, to get students get started on *Facebook*, instructors should create an icebreaker activity on *Facebook*, such as a posting a topic to solicit student discussion or inserting a video accompanied with study questions, to help develop a classroom community and establish positive relationships. Fourth, when integrating *Facebook* into their courses, instructors should designate student involvement on *Facebook* as an option, as not all students are registered users, and provide students other alternatives. Lastly, if using the site as a course tool, it is suggested that instructors post pod costs, websites, and videos on *Facebook*, and, using Google Documents, link students to study guides, *power point f*iles, assignments, and tutorials. Instructors can contact students on *Facebook* by sending messages, posting comments on "*wall*" or chatting with students during virtual office hours. By increasing student involvement through communication and community, instructors can tailor their courses towards a variety of learning styles.

Additionaly by Susilo (2008) noted that *Facebook* has important factors that influences learning especially in distance learning, such as:

- Interactivity, that means the way in which the group dynamics of interactive, networked, learning communities are seen as desirable for educational philosophies that emphasize student-centered as opposed to teacher directed learning.
- Closed Collaboration that means through enhanced collaboration, learners become involved in learning activities that are associated with a social network, which provides them with

greater motivation and opportunity to articulate, discuss, and reflect on their learning strategies and the changes within themselves.

- Learning cannot be adequately facilitated, therefore, solely by introducing learners to prototypical or decontextualized concepts, even when they are well defined.
- Sustainable Learning Environments continuous learning comes to be seen more and more as a necessity for almost everyone in our rapidly changing and increasingly global society, the demand for more flexible educational environments increases accordingly.

Generally, from the exposure above the important thing to be considered is the readiness between teacher and student to use *Facebook* as instructional media. Not only the ability and understanding on important factors in using *Facebook*, but also the substance materials become very important on how and what the concepts, principals, procedures, or facts are so that the objective of learning itself can be obtained well.

Conclusions

Facebook is one of the hottest things happening right now. This major prominence happens because *Facebook* has always been designed to focus on creating and maintaining real relationships and on building a sense of online community. *Facebook* have brought in a lot of new features that makes it as pivotal part of daily life. Recently, *Facebook* has opened up development of downloadable applications, which can be further supplement for the educational functions of *Facebook*. While many of these technological tools mirror those found in currently employed courseware programs (e.g. blackboard, moodle, etc.), the ability and ease with which an individual (instructor or student) can upload photo and videos, the frequent and seamless updates and maintenance, the generous 1024 MB limit on videos, and the compatibility with a wide variety of web browsers are superior to some courseware options. In other words, *Facebook* could be media alternative in instructional while traditional instructional communication in classroom setting has always been at a premium. When delivering learning materials outside the classroom, the important thing is that technology and techniques could support learners and improve communications between students and teachers.

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IMPLEMENTING BLENDED LEARNING A CASE-BASED SHARING EXPERIENCE

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Abstract

This paper is based on a single case study research methods toward "the Introductory to Learning Organization" course at the Department of Educational Technology, the State University of Jakarta. This research was aimed to describe as is how the blended learning forits course was designed, developed and implemented. Multiple data collectiontechniques were used in this research, i.e. observation, archival and document analysis, interview and questionnaire. This research resulting some research findings as follows: 1) the type of blended learning used is the combination of live face-to-face learning, asynchronous online collaboration and self-paced asynchronous activities; 2) online learning activities facilitated by a non-proprietary platform of learning management system (LMS), i.e. claroline (http://courses.web-bali.net) and a community blog i.e. TPers.Net (http://tpers.net); 3) not all e-learning tools facilitated by LMS used to facilitate online learning activities, but only discussion forum, mailing list, and assignment; 4) blog was used as a mean of reflection to express and share lesson learned among students; 5) instructional methods used in online learning activity comprises of discussion through forum discussion, reflection and sharing through blogging, reading and review through literatures searching and reading, presentation through uploaded slide presentation; 6) instructional methods used in live face-to-face activities are more focused in in-depth case study and deepening student's understanding to the related topics learned, i.e. brainstorming, student presentation and discussion, and case study. Through this paper, authors would like to share experiences in how its blended learning was designed, developed and implemented including challenges and hindrances faced in its implementation. Hopefully, through this case-based sharing experience will inspired participants and the authors will gain some constructive feedback and inputs from participants.

Keywords: blended learning, instruction, online learning, face-to-face, e-learning tools

BACKGROUND

Information and communication technology, esp. computer and internet has influenced all aspect of human life, including education. These emerging technologies, has become a new and special attention for educators, especially in higher education. But, its application in Indonesia is still limited due to several factors such as familiarity of educators to the emerging technology itself, lack of policy support both at national level and school level, inadequate ICT infrastructure and facilities, inadequate other resources support, etc.

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Several universities and higher education institutions in Indonesia, are sporadically has initiation to implement the application of computer an internet for learning (e-learning), such as University of Indonesia, University of GadjahMada, Bandung Technological Institute, the State University of Jakarta, etc. This application of e-learning is a subject of interest to be scientifically studied for better future improvement. The authors interested to find out why and how an e-learning application program were implemented in one of those universities mentioned above, i.e. the State University of Jakarta, especially the implementation of blended learning at the Department of Educational Technology. The research was focused on its implementation to one course, i.e. the Introductory to Learning Organiozation.

THEORETICAL FRAMEWORK

e-Learning

e-learning is a generic term that explain the use of electronic technology for learning. Author defines e-learning simply as "*an electronic technology-enabled learning*". Some authors define e-learning differently, but has a common purpose, i.e. to facilitate learning be more effective, efficient and appealing.

On this paper author choose two definition of e-learning from two authors. e-learning is commonly referred to the intentional use of networked information and communications technology in teaching and learning. A number of other terms are also used to describe this mode of teaching and learning. They include online learning, virtual learning, distributed learning, network and web-based learning. Fundamentally, they all refer to educational processes that utilize information and communications technology to mediate asynchronous as well as synchronous learning and teaching activities. (Naidu, 2006)[1] While, Derek Stockley (2006)[2] define e-learning as the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material.

e-Learning System Model

Rashty (1999) as quoted by Noirid*et.al.* (2007)[3]classifye-learning delivery system model into three categories, i.e. adjunct, mixed or blended, and full online. This model is viewed as a continuum rather as discrete classification. It can be figured out as follows:

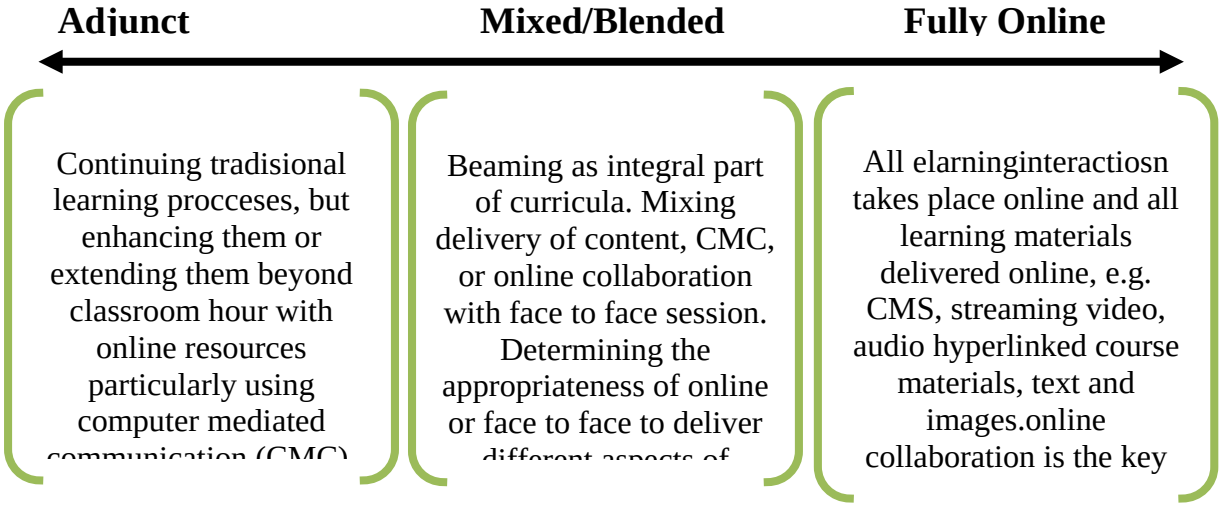

Figure 1: e-Learning Delivery System Model
(adapted from Rashty (1999) by Noirid*et.al.* (2007)

Blended Learning

One of the continuum of e-learning delivery system model as mentioned above is mixed/blended learning that mix delivery of content, computer mediated communication and or online collaboration with face-to-face instruction appropriately. This means that when delivering blended learning we should pay attention to the appropriateness of decision when, why and how to use online method and when, why and how to use face-to-face instruction. Blended learning is not the same with 50% online and 50% face-to-face.

Blended learning combines the best aspects of online learning, structured face-to-face activities, and real world practice. Online learning systems, classroom training, and on-the-job experience have major drawbacks by themselves. The blended learning approach uses the strengths of each to counter the other weaknesses. (Soekartawi, on http://uny.ac.id), downloaded in 2010).[4] In line with Soekartawi, Graham *et.al.* (2006)[5], classified three kinds of combination of instruction in blended learning, i.e. 1) combination of instructional model; 2) combination of instructional method; and 3) combination of online and face-to-face learning.

What is the differentiation between online learning and blende learning? The definition of an online program or blended program is similar to the definition used for courses; an online program is one where at least 80 percent of the program content is delivered online and a blended program is one where between 30 and 79 percent of the program content is delivered online (Allen, *et.al.*, 2007).[6] Allen figured them out as follows:

Proportion of Content Delivered Online	***Type of Course***	***Typical Description***
0%	*Traditional*	*Course with no online technology used - content is delivered in writing or orally.*
1 to 29%	*Web Facilitated*	*Course which uses web-based technology to facilitate what is essentially a face-to-face course. Uses a course management system (CMS) or web pages to post the syllabus and assignments, for example.*
30 to 79%	*Blended/Hybrid*	*Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has some face-toface meetings.*
80+%	*Online*	*A course where most or all of the content is delivered online. Typically have no face-to-face meetings.*

Table 1: Classification of Course (Allen, *et.al.* 2007)

Blended learning is the combination of multiple approaches to learning. Blended learning can be accomplished through the use of 'blended' virtual and physical resources. A typical example of this would be a combination of technology-based materials and face-to-face sessions used together to deliver instruction. In the strictest sense, blended learning is anytime any instructor combines two methods of delivery of instruction. Currently this area is

divided into the following 3 sub areas, as follows: (e-TQM Blended Learning Approach, on http://www.etutors-portal.net/portal-contents/blended, downloaded on November 10, 2009).[7]

Figure 2: *e-TQM College Blended learning Approach*

Finally, we figure out the model of blended learning according to Staley (2007)[8] that can be shown as follows:

Live In-Person	Synchronous Virtual Collaboration	Asynchronous Virtual Collaboration	Self-Paced Asynchronous
• Instructor-led classroom training • Hands-on labs • Coaching/mentoring • On-the-job training	• Live Online Learning • Online chat/IM sessions • Conference calls • Video conferencing	• Online discussion boards • Listservs • E-mail • Blogs • Wikis	• Online tutorials • Simulations • Online self-assessments • Archived Webinars • Podcasts • CD-Roms

RESEARCH METHODS

This research was aimed to answer a main question i.e. *"How blended learning strategy applied and implemented in the course of Introductory to Learning Organization?"*. Research setting is in the Department of Educational Technology. Single case study research method and multiple data collection techniques, such as observation, interview and document/archival records analysis was used to answer the focus of research mentioned above. In-depth interview conducted toward seven students and one lecturer and video taped recording used to observe the live face-to-face activities. While archival and document analysis use to support and deepening understanding toward research findings.

RESEARCH FINDINGS AND DISCUSSION

Type of Blended Learningand Instructional Methods Applied

As mentioned on theoretical framework above that blended learning is not simply combine the online and face-to-face instruction, but the appropriate combination of any kinds of instructional method, model and delivery strategies both live face-to-face, synchronous virtual collaboration, asynchronous virtual collaboration, and self-paced asynchronous activities. Research finding revealed that in the course of the Introductory to Learning Organization, the lecturer mostly combine live face-to-face instruction, asynchronous virtual collaboration and self-paced asynchronous activities. Observation and archival records found that not all methods choose and used by lecturer. Method used in live face-to-face instruction was lecture, case study, group presentation and discussion. Live face-to-face were more focused to deepening students understanding on the subject or certain topics. Method used in asynchronous virtual collaboration was blogs, online discussion boards and listserve. Method us in self-paced asynchronous activities was online searching, online reading and online assignment. Interview with lecturer showed the reason why synchronous virtual collaboration was not used. Asynchronous virtual collaboration needs more times and assistance from other. It can't be handled by one person.

e-Learning Tools Used

Research findings showed that not all e-learning tools used in blended learning strategy for the course of the Introductory to Learning Organization. Online learning activities, both asynchronous online collaboration and self-paced asynchronous activities, was facilitated by a non-proprietary learning management system, i.e. claroline (http://www.web-bali.net) and a non-proprietary content management system, i.e. wordpress (http://www.tpers.net). Almost all facilities offered in learning management system was used, except online test. Facilities used were learning path, course description, assignment, announcement, discussion forum, and document as repository of any kinds of learning materials. Content management system, i.e. wordpress (http://tpers.net) was used as a community blog that played important role as a mean to reflect and share information, experience and lesson learned among students.

Learning Materials

Research finding show that one of the weakness of blended learning strategy used for the course of the Introductory to learning Organization is lack of learning materials variation used. Interview data showed that most students complaining the lack of learning materials used. Archival records analysis showed that learning materials used were mostly text-based digital content, i.e. pdf, doc, html, and ppt. Interview with lecturer showed that multimedia-based learning materials, such as animation (swf), video (flv), audio (mp3) etc needs more resources (both time, money and experts) to develop them well.

Evaluation System

Research finding showed that evaluation system used in this blended learning strategy was 1) group presentation judge by other students with certain form prepared by lecturer; 2) group paper and group project judged by lecturer; 3) peer review activities, criticizing and feedback toward blog posting posted by his/her peer and 4) student' participation on discussion forum.

Student' Opinion and Preference

Researcher categorized the learning process into three categories, i.e. introduction, main activity and closing. On introduction phase, especially for the explanation of course description and relevancy, five out of seven students more prefer to live face-to-face activities than online activities, since they can ask more detailed directly to the lecturer. Two other students stated that online description would be fine as long as more interactive media used such as video or animation. But, for the explanation of course goal and objectives, all students stated that both online and face-to-face would be fine. This mean that in the first session, it's important for teacher/lecturer to delivered it face-to-face.

On the main activities, all students stated that discussion through online forum discussion is more appealing than in the classroom discussion forum. One weakness of the forum discussion, according to the interview result was delayed feedback and lack of feedback intensity from the lecturer. The same statement also stated to the activities of blogging as a mean of reflection and sharing lesson learned. Lack of feedback intensity make them unmotivated and feel not appreciated. Students prefer lecturer to pose relevant case to the forum discussion prior to discuss more deeply in the classroom.

On the closing phase, as the follow-up activities they also have no problem with online assignment since the assignment was directly send automatically to their own email account. But, they prefer to onsite test than online test due to the some error that always happened when the test conducted online. Beside, students prefer to essay and case-based test than objective test such as multiple choice, true or false, etc.

Supporting Factors and Hindrances

Based on interview with the lecturer, it was found some supporting factors and hindrances in implementing blended learning. Some supporting factors are 1) the availability of internet access both at campus or home; 2) the high of students and lecturer familiarity or literacy on computer and internet; 3) the availability of online learning resources that can be found and downloaded through internet; 4) lecturer and most of students has own computer facilities such as PCs, laptop, notebook or even PDA, etc.

Lecturer also said that the main hindrance in implementing e-learning or blended learning is the lack of policy from the university or faculty. Implementation of blended learning sporadically initiated by few number of lecturers without political supports. Other hindrances are 1) lack of adequate and varied learning object (learning materials) that is designed and developed well for e-learning purpose; 2) lecturer familiarity or literacy toward platform of learning management system used; 3) e-learning/blended learning needs more sacrifice (both time, energy, and money) from lecturer compare to traditional instruction; 4) inadequate supporting computer and internet access and facilities at campus (esp. slow internet speed and limited internet bandwidth).

CONCLUSIONS AND LESSONS LEARNED

Conclusions

Blended learning is the futuristic learning strategy that is very important to facilitate learning more effective, efficient and appealing for students. The weakness on online instruction can be overcome by the strength of live face-to-face instruction, and vide versa, the weakness of live face-to-face instruction can be overcome by the strength of online instruction. E-Learning should be viewed as a continuum rather than simply as discrete classification. The appropriateness method and delivery strategies between online and face-to-face instruction is the success key for a quality blended learning implementation. In this research case, it's

proofed that the simple application of blended learning that only combine among live face-to-face instruction, asynchronous online collaboration, and self-paced asynchronous activities can be implemented well and perceived positively by the students.

Research finding showed that students prefer to live face-to-face than online instruction in the phase of introduction esp. for the explanation course description and relevancy. On the main activity phase, students prefer to online instruction for the activities of discussion through forum discussion board, and sharing and reflection through blogging. But, the also suggest the lecturer to pose problem online in the discussion forum board prior to discuss more deeply in the classroom (live face-to-face instruction). Immediate and intensity of feedback from lecturer is a success key to the activity of discussion both through discussion forum board and blogging. On the closing activity phase, student prefer to online activities for assignment, but live face-to-face activity for evaluation or test.

Supporting factors for the succeed of blended learning are 1) the availability of internet access both at campus or home; 2) the high of students and lecturer familiarity or literacy on computer and internet; 3) the availability of online learning resources that can be found and downloaded through internet; 4) lecturer and most of students has own computer facilities such as PCs, laptop, notebook or even PDA, etc.the main hindrance in implementing e-learning or blended learning is the lack of policy from the university or faculty. Other hindrances are 1) lack of adequate and varied learning object (learning materials) that is designed and developed well for e-learning purpose; 2) lecturer familiarity or literacy toward platform of learning management system used; 3) e-learning/blended learning needs more sacrifice (both time, energy, and money) from lecturer compare to traditional instruction; 4) inadequate supporting computer and internet access and facilities at campus (esp. slow internet speed and limited internet bandwidth).

Lesson Learned

Policy support is a must when implementing blended learning. The way people communicate and learn is change, so the way people teach and learn. As a consequence the policy that governs the instruction process should also change. Student' familiarity and literacy on computer and internet, the availability of learning resources on internet, the availability of internet access are opportunities to changes the way we teach students. It's important to shifting our paradigm of teaching from the traditional paradigm to the new one that is more constructive enabled by electronic technology. Lecturer ICT literacy should be improved not only how to use and apply electronic technology well, but also hoe to use and apply them appropriately where the learning philosophy, not the electronic technology itself, become the main foundation. Well designed blended learning, supported with strong policy, e-learning environment and facilities, adequate and varied relevant learning objects, and qualified lecturer are four success keys to implement blended learning well.

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FULL DAY: A INNOVATION OF EDUCATIONAL SYSTEM

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ABSTRACT

Full day (A Innovation of Educational System) by Samsidar Tanjung,, This aimed the study to overcome the problems of education of children for working parents especially in big cities and As a solution to address the education of children in urban areas with various kinds. Problems that can make children afraid of destructive personality / behavior of children.

Age era of globalization, gender in the household the more obvious it is she who will lead the wife and husband do not have any work restrictions, especially those in big cities.

Working hours of parents, partner closely with the burden of office work each, making them feel the need to entrust the education of their children in one trusted institution, full school day to accommodate the child's choice to go home at night, shortly before the arrival of his parents, still enough time to clean ourselves and get ready for the father and / or mother of the office.

In starting with the basic concepts of diffusion of innovation is a process by which an innovation is communicated through certain channels over a certain period members of a social system. Notes written in bold. In the diffusion of an innovation, there should be an innovation itself, through a communication channel such innovation was introduced, to whom, within a specified period.

The Diffusion process that involves specific communication techniques that must be accepted by a specific system problems. All innovation, have different characteristics in terms of innovation it self and the social system in which innovation will be introduced. Therefore, the communication approach that should be used will also differ from each other. This is where the challenge for agents marketing products and services (innovation) specific.

Some target and innovation of the Place will be create in this problem there are : 1). Urban community whose parents work all day, 2). Housewives who are busy so no time to pay attention to her child, 3). Education needs to adapt to the era who developed the era of globalization, that all types of technology and short physic arrived to the area and time, 4). Want the benefits of the child and prepare to face an era globalization in order to survive.

Supporting of some Factors there are Knowledge. Economy, School Curriculum, School Facilities Infrastructure and also It should be Professional Teachers Ready To Educate Children in Full Day School. Guiding, educating, and overcome the Psychological contained in children.

Channels of communication used to promote a full day is the mass media such as newspapers, radio, television and Iain more. It can also be informed through such scientific meetings, seminars, workshops and other more.

The stages of diffusion to collect : Understanding Stages, Stages of Persuasion Stages of Decision and Stages of Implementation will be make Implementation occurs when a new idea on the part of his life, this activity was related to the notion of behavior. Full day program if accepted by the

adopter means they use it and apply it in accordance with the ideas that have been raised if accepted will be adopted, if rejected his ideas, the rejection occurred.

INTRODUCTION

A. Background of The Problem

Education is how to make a change. Only with education then everything changed. Needs or needs arising accompany normal human desire to overcome problems in life. The problem is part of human life. partly derived from nature or derived from the interaction with the natural environment. Given these problems arise the ideas, methods, and new objects.

Age era of globalization, gender in the household the more obvious it is she who will lead the wife and husband do not have any work restrictions, especially those in big cities.

Working hours of parents, partner closely with the burden of office work each, making them feel the need to entrust the education of their children in one trusted institution, full school day to accommodate the child's choice to go home at night, shortly before the arrival of his parents, still enough time to clean ourselves and get ready for the father and / or mother of the office.

In this family structure, the existence of domestic servants (PRT) as a necessity. Their job is not just cooking and cleaning house, washing, and ironing, but grew to straighten kids school supplies and study guide. However, will lesson with him would be optimal ?

With maximum General high educational background though, will the workers have the authority / capacity to guide children to learn and worship? Or powerless in the power and the wishes of children and let him watch TV, play computer games, or Internet access at will to the virtual world ?

B. The Problem of The Study

Is Full Day really be able to print the children become independent children, socialize and large both in religion and more to master lessons.

C. The Aims of The Diffusion

1. To overcome the problems of education of children for working parents especially in big cities.
2. As a solution to address the education of children in urban areas with various kinds. Problems that can make children afraid of destructive personality / behavior of children.

D. The Advantages of The Diffusion

Being one of the options for parents to cope with the higher education of children, especially in big cities.

CHARACTERISTICS OF INNOVATION

A. The Attributes of Innovation

Attributes or characteristics of the innovation against the relative advantage, compatibility, complexity, easily observed, and possible innovations attempted by the prospective adopter's perception can be used as a basis for assessing the innovation.

1. Relative service

An innovation can be seen profits relative to its user. The candidate of Adopter for judge something new based on the relative advantage of new things in accordance with the perception. These benefits can be economic, or non-economic. An innovation is considered to have relatively high profit if the innovation had been valued by the prospective adopter as an innovation that can increase profits while bringing economic and non economic benefits such as status increases, and increasing prestige.

2. Suitability

An innovation can be seen to be consistent with some things. Prospective adopters judge something based on the fit between innovation with ideas, ways that have been there before, in accordance with the values or norms, and compatibility with a variety of other backgrounds.

3. Complexity

An innovation usually also see the level of complexity. Prospective adopters will judge whether an innovation is considered to be complex or simple in terms of its use. The use of more complicated than an innovation in view of the prospective adopters, the lower the level of adoption, if the simple use of an innovation in view of the prospective adopter would be a higher level of adoption.

4. Ease observed

An innovation is reflected in the ease of measurements were made when innovation is used.

5. Possible attempt

An innovation will be judged by the prospective adopter in this case likely will be tried. If an innovation is easy in the trial, usually more potential area of spread in the community faster.

In starting with the basic concepts of diffusion of innovation is a process by which an innovation is communicated through certain channels over a certain period members of a social system. Notes written in bold. In the diffusion of an innovation, there should be an innovation itself, through a communication channel such innovation was introduced, to whom, within a specified period.

The Diffusion process that involves specific communication techniques that must be accepted by a specific system problems. All innovation, have different characteristics in terms of innovation it self and the social system in which innovation will be introduced. Therefore, the communication approach that should be used will also differ from each other. This is where the challenge for agents marketing products and services (innovation) specific.

On school days full of activities centered on school children, starting at 07.30 Am to 36.00 O'clock Pm. All activities are loaded with educational value.

Starting from an appointment in the morning, the teachers had students guide to focus on one activity only, followed by prayers in the morning to start activities in the morning day, arouse awareness of students to always start all activities by asking the permission of The Allah.

Learning, of course, included with the prevailing moral demands, such as learning to respect other people's opinions, listen well, ask for permission to borrow a friend stationery, to ask permission to drink in the midst of learning.

Rest was used to eating healthy snacks, accompanied by a willingness to share with friends. On this occasion too, the teacher can introduce various types of snacks in accordance with what children eat, remind students to dispose of waste in place, to clean up the crumbs or packaged snacks that they carry. Students learn.

Rest days are used to break a break from routine activities, for prayer and lunch. Teachers lead the prayer or even students who take turns leading and become priests. One of the lessons about the value system of worship which is very good along with the applications as well.

Lunch activities also need to be utilized to remind students to be grateful for every blessing that God has given. Students learn to be responsible for spending their food on a plate and return the empty places that have food to the kitchen.

Go home, school activity closes with as prayer, teachers remind students to also perform their prayers at home (sunset, evening, and at dawn the next day).

ANALYSIS OF ENVIRONMENTAL

A. Target and Innovation of The Place

Target :

1. Urban community whose parents work all day
2. Housewives who are busy so no time to pay attention to her child.
3. Education needs to adapt to the era who developed the era of globalization, that all types of technology and short physic arrived to the area and time.
4. Want the benefits of the child and prepare to face an era globalization in order to survive.

B. Innovation of The Place :

World of education including school systems located mainly in urban schools both public and religious-oriented schools.

Supporting Factors

1. Knowledge

Characteristic transfer of knowledge and competitive advantage to one view of knowledge management focuses on the characteristics of knowledge that has a significant impact on the competitive advantage one organization or one company taking into consideration all these factors then there are four conditions that must be the character of knowledge in the meet to achieve the knowledge as a strategic asset not easy to copy and exchange and has a good power stability (Amit and Schoemaker, 1993, Barney, 1991) to meet the four requirements, we must analyze each of the education transfer.

1. Tacit knowledge and knowledge has a personal component that makes it difficult for explicit and communicated foemasi (Tacit). Then Ekcplicit can easily be communicated by using language which systematically (Hill and Ende, 1994 Nonaka, 1991)

2. The level of complexity of knowledge has a significant impact depends on the creation of competitive advantage company that combines the capabilities and resources power combination that will provide knowledge that is difficult to imitate

(Rogers, 1983, Winter, 1987, Zande and Kogut, 1985)

3. Level of specificity (Degree of Spesificity) to build competitive advantage source of knowledge that promotes ambiguity so that's problem create knowledge to difficult to imitate (Barney, 1991)

4. The sistemic knowledge of a knowledge which is more difficult to mimic the legal process and it is Coordination.

In this case, it means that knowledge is a problem of education in the era of globalization for the education of children, for parents who work a full day is very helpful for them in terms of children's education either formal or general education in it at once, including religious education.

Some quotes comments from parents via Face Book saying Full day really can print the child becomes an independent children's great socializing both in religion and master the lessons. Children also need to learn with the environment. They need to get a good lesson and neighbors. choose a good environment, controlling the emotion in the outside world is heterogeneous full day can be said of a saturated mother said boring for teachers and students when the teacher is less variable in educating students, in a full school day are not entirely routine learning activities during the day relaxed and enjoyable extracurricular lessons .

2. Economic

Economic factors play an important role for the school day. Income families will spend more for a full day school education is usually primarily to pay for school children.

3. School Curriculum

What really can accommodate students' needs both in terms of knowledge, learning, social skills and cultural and religious.

4. School Facilities Infrastructure

School facilities and infrastructure must be able to facilitate the needs of children in accordance with what is expected, particularly in developing socio-cultural knowledge and skills of his religion.

5. It should be Professional Teachers Ready To Educate Children in Full Day School.

Guiding, educating, and overcome the psychological contained in children.

Innovation Barriers

1. Economic

Not everyone can fulfill his desire to attend a full school day in a full day because it is a big expense.

2. Special Curriculum

Could reduce the existing curriculum and need to be developed again by the school in accordance with the characteristics of schools, communities, and his son.

3. Knowledge

Lack of full understanding of the day both by individuals and the community so that programs can be hampered by the refusal of innovation either individuals or communities have the power or skill status.

There are three types of innovations that make decisions about the choice and collective decision-making authority. These three issues are very important in deciding what is acceptable or not acceptable.

INNOVATION STRATEGY AND TACTICS MENDIFUSIKAN

Consciously or unconsciously a full day program has been running mainly in big cities. According to Rogers that larger organizations more innovative, but now this process of innovation

and the factors associated with Tiu innovation itself is a complicated job, as has been suggested that the organization with Innovation influenced by several factors, especially the characteristics of leaders, internal and external characteristics. The decision making process there are five stages of innovation adoption, 1) preparing the agenda, 2) definition, 3) repetition, 4) countinuity and 5) clarification. Five stages can be grouped into two processes, namely the initiation and implementation.

The preparation of the agenda of other causes of the needs of innovation and adjustment on the needs of innovation and the match with a particular innovation. Restructuring phase is taken from outside the organization's innovation when innovation in modifying.

The process of innovation strategy.

The Judge of Adoption

I. INITATION II. IMPLEMENTATION

1. Matching of Agenda	2. Organization	3. Rekonstruction	4. Klarification	5. Continuity
Matching Public Relations problem Innovation	Organization that issues from between the modified	The organization and the preparation and found	The agenda with the return to innovation in organizations and innovation as needed to formulate losses	Organization innovation more clearly identified

Informing and Communicating.

Diffusion of innovation a full day program related to the school, especially in the big cities with the idea that schools can solve the problem in general education, special education in school is for children to studying regularly give formal science. In addition

above it is also about how to solve environmental problems a situation to studying children, among others, the environmental vision of the social environment of learning environment and psychological environment. For that information and communication factors play an important role in this respect to disseminate what actually benefit from this full day?.

Channels of communication used to promote a full day is the mass media such as newspapers, radio, television and Iain more. It can also be informed through such scientific meetings, seminars, workshops and other more.

Innovation Tactics

Courses offered are programs that are not common in a place get in other places that have good value in terms of flu-service, teachers, curriculum, facilities and Iain more.

STEP OF DIFFUSION

> Understanding Stages

Through the channels of communication and information adopters as people with information to know the advantages and disadvantages of the programs offered so that adopters can decide to accept or reject the innovation itself. Diffusion of innovation can provide insight through an agent or

renewal of such government agencies, the Department of Teacher Education, Students, Employees, scholars, and community leaders.

> Stages of Persuasion

Provide easy-term in mind by adopter, explaining the ideas through seminars, workshops with information on personal communication channels, newspapers, mass media, community leaders, the Internet. Failure or success of previous ideas to create a foundation to transform it into new ideas to improve the idea that gaga! previously. Stage should be noted for diffusing innovation. The decision making process in accordance with the characteristics a adopter candidate and communication channels and decision-making process that must be met by the attributes of innovation itself.

> Stages of Decision

So the requirement to make a decision diffusing innovation in a way has the advantage of a relatively high level of appropriateness of high complexity low, most likely to try and easy to observe the results will require the adoption process directly compared with previous innovations. The decision stage occurs when a person has reached the provisions of intent or choose to accept or reject the idea of something new. This decision occurred more than once means that people decide not to adopt it could turn into adoption or otherwise.

> Stages of Implementation

Implementation occurs when a new idea on the part of his life, this activity was related to the notion of behavior. Full day program if accepted by the adopter means they use it and apply it in accordance with the ideas that have been raised if accepted will be adopted, if rejected his ideas, the rejection occurred.

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THE EFFECT OF Sr OR TiB ON THE MICROSTRUCTURE OF Al-6%Si ALLOY WITH DIRECTIONAL SOLIDIFICATION METHOD

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Abstract

Aim of this work is to study influence of Sr or TiB addition to the mechanical properties and microstructure of Al-6%Si alloy on directional solidification process.

Material of Al-6%Si, Al-6%Si+Sr and Al-6%Si+TiB with clay isolation were melted in electric crucible at 700 ^{0}C and be solidified by directional solidification process. The microstructure changes were studied by optical microscope.

The results show that the directional solidification process and addition of Sr or TiB in Al-6%Si alloys modify the morphology of microstructur. The experiment result demonstrated that directionality of columnar structure were promoted by the addition of Sr. The addition of Tib was not significant to promoted this directionality.

Key Word: The directional solidification, columnar, Al-6%Si.

1. PENDAHULUAN

1.1. Latar Belakang

Perkembangan industri yang berbasis logam sudah semakin pesat, tentunya hal ini juga disertai dengan kemajuan teknologi di bidang pengolahan dan pemanfaatan logam. Kebutuhan akan produk dengan spesifikasi dan tujuan tertentu mengharuskan manusia untuk menemukan teknologi yang bisa menjawab semua tantangan tersebut. Suatu contoh industri transportasi yang tidak hanya membutuhkan material yang kuat, tapi juga harus ringan, tahan korosi dan mampu menahan terhadap beban yang besar, begitu juga dengan industri yang memproduksi mesin-mesin pembangkit tenaga seperti turbin gas dan mesin jet, maka dibutuhkan sudu turbin atau propeller yang bisa menahan beban aksial pada temperatur tinggi.

Proses untuk menghasilkan material dengan kekuatan tarik tinggi, mampu *creep* yang baik serta tahan terhadap beban aksial pada temperatur tinggi tidak dengan pemaduan yang baik saja, akan tetapi juga dibutuhkan struktur butir planar, sellular, atau setidaknya struktur kolumnar. Struktur tersebut, bisa didapatkan dengan metode pembekuan searah (*directional solidification*) (Axmann, 1983).

Aluminium dalam kondisi murni memiliki sifat-sifat yang rapuh/lunak, maka dari itu harus dipadu dengan unsur lain untuk memperbaiki sifat-sifat mekanisnya.Paduan aluminium dan silikon akan memperbaiki sifat mekanis dari aluminium murni. Paduan Al-Si ini banyak dipakai pada komponen otomotif karena mempunyai kelebihan yang dibanding dengan aluminium paduan lainnya. Paduan ini mempunyai kelebihan antara lain ketahanan korosi yang baik, ringan, tahan terhadap retak panas *(hot tearing)*, mampu mesin, mampu cor, serta koefisien muai panas yang

rendah, sehingga memungkinkan bekerja pada temperatur yang tinggi (Surdia dan Sato, 1992) dan (Smith, 1993).

Paduan aluminium juga digunakan sebagai bahan untuk pembuatan baling-baling kapal, sudu pada turbin dan impeller pada pompa. Struktur butir dengan orientasi searah sangat dibutuhkan pada komponen tersebut sehingga mampu menahan beban aksial dan memiliki mampu *creep* yang baik (Axmann, 1983). Penelitian ini menggunakan paduan Al-6%Si dengan penambahan Sr atau TiB dan dilakukan proses pembekuan searah (*directional solidification*), selanjutnya dilakukan analisa struktur mikro, uji tarik dan uji kekerasan.

1.2. Batasan Masalah

Penelitian ini hanya dibatasi pada:

1. Pengaruh Sr atau TiB terhadap kekuatan tarik, kekerasan dan struktur mikro paduan Al-6%Si dengan metode pembekuan searah.
2. Cetakan menggunakan pipa stainless steel dengan isolator tanah liat.
3. Dimensi spesimen adalah panjang 100 mm dan diameter 6 mm.

1.3. Tujuan Penelitian

Penelitian ini bertujuan untuk memperoleh pengetahuan tentang:

1. Pengaruh proses pembekuan searah pada paduan Al-6%Si terhadap struktur mikro.
2. Pengaruh Sr pada paduan Al-6%Si terhadap struktur mikro dengan metode pembekuan searah.
3. Pengaruh TiB pada paduan Al-6%Si terhadap struktur mikro dengan metode pembekuan searah.

1.4. Manfaat Penelitian

1. Penelitian ini diharapkan dapat memberikan kontribusi yang positif bagi pengembangan ilmu pengetahuan dan teknologi, khususnya teknologi di bidang pengecoran.
2. Penelitian ini dapat digunakan sebagai referensi bagi penelitian berikutnya.

II. TINJAUAN PUSTAKA

2.1. Kajian Pustaka

Penelitian tentang proses pembekuan searah pada logam telah dilakukan oleh peneliti-peneliti terdahulu, antara lain Smith dkk, (1967), Stone dkk, (1998), Gunduz dkk, (2000) , kim dkk, (2000), serta Kaya dkk, (2003).

Metode Bridgman dilakukan pada penelitian Smith dkk, (1967), Stone dkk, (1998), Gunduz dkk, (2000), dan Kaya dkk, (2003), sedangkan Kim dkk (2000) menggunakan metode *Ohno Continuous casting*. Cetakan yang digunakan pada penelitian diatas adalah grafit kecuali stone dkk (1998) yang menggunakan alumina dan Smith dkk (1967) menggunakan bahan refraktori.

Penelitian tentang proses pembekuan searah pernah dilakukan pada paduan Al-12,6%Si, Al-11,3%Si, Al-(3, 6, 15, 24)%Cu, Al-3,5%Fe-8,5%Si, dan baja karbon.

Kaya dkk, (2003) meneliti tingkat kekerasan pada paduan Al-12,6%Si dengan membandingkan gradien temperatur, laju pertumbuhan butir dan jumlah flake. Kim dkk, (2000) meneliti struktur mikro pada paduan Al-11,3%Si dengan menambahan Ti dan Sr, kemudian dilakukan variasi kecepatan pengecoran 100, 300, dan 500 mm/menit. Gunduz dkk, (2000) meneliti

struktur mikro pada paduan Al-(3, 6, 15, 24) %Cu dengan melakukan variasi pada gradien temperatur, laju pendinginan serta komposisi. Smith dkk, (1967) meneliti struktur mikro pada baja karbon dengan melakukan variasi terhadap laju pembekuan. Stone dkk, (1998) juga telah meneliti struktur mikro pada paduan Al-3,5%Fe-8,5%Si dengan mengontrol kecepatan pembekuan, gradien temperatur dan pertumbuhan butir.

Laju pembekuan sangat berpengaruh terhadap tingkat kekerasan dan struktur mikro. Tingkat kekerasan Al-12,6%Si naik seiring dengan peningkatan laju pertumbuhan butir (Kaya dkk, 2003). Kekuatan tarik meningkat seiring dengan peningkatan kecepatan pengecoran (Kim dkk, 2000). Disamping itu peningkatan laju pembekuan (V) pada gradien temperatur konstan dapat menurunkan *primary dendrite arm spacing* (Gunduz dkk, 2000).

Parameter lain yang berpengaruh terhadap sifat mekanis pada proses pembekuan searah adalah gradien temperatur. Tingkat kekerasan Al-12,6%Si naik seiring dengan peningkatan gradien temperatur (Kaya dkk, 2003). Peningkatan gradien temperatur (G) pada V konstan menimbulkan penurunan komposisi pada *secundery dendrite arm spacing* (Gunduz dkk, 2000).

Modifikasi paduan dengan menambahkan 0,02% Sr dan 0,2% Ti dapat memperbaiki orientasi butir dan meningkatkan fraksi luas dendrit dalam struktur mikro (Kim dkk, 2000).

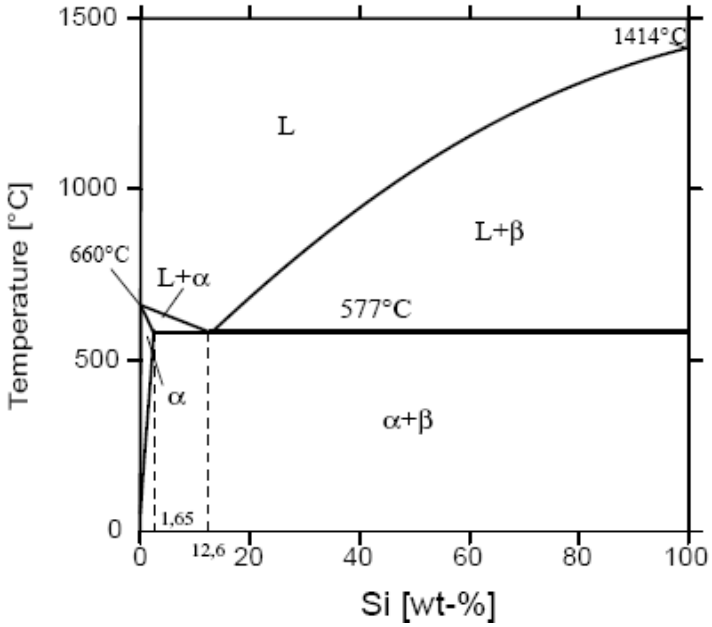
2.2. Landasan Teori

2.2.1. Paduan Aluminium -Silikon (Al - Si)

Aluminium paduan Al-Si memiliki sifat mampu mesin yang baik, koefisien muai panas yang kecil dan sebagai penghantar yang baik untuk listrik dan panas. Paduan ini juga mempunyai ketahanan korosi yang baik, sangat ringan, tahan terhadap retak panas *(hot tearing)* serta mampu mesin dan las yang baik. Paduan Al-Si ini banyak dipakai pada komponen otomotif karena mempunyai kelebihan dibanding dengan aluminium paduan lainnya. (Surdia dan Sato, 1992) dan (Smith, 1993).

Paduan Al-Si dapat dibedakan menjadi 3 macam, yaitu paduan *hypoeutectic, eutectic,* dan *hypereutectic*. Paduan dengan kandungan silikon lebih rendah dari 12,6 % disebut paduan *hypoeutectic*, dengan kandungan 12,6% silikon disebut paduan *eutectic*, sedangkan yang lebih besar dari 12,6 % disebut *hypereutectic*. Kekuatan dan keuletan dari paduan terutama dengan silikon yang tinggi dapat diperbaiki dengan modifikasi dari silikon *eutectic* Al-Si (ASM Handbook Aluminium,1993).

Logam Al dan Si pada kondisi murni membeku pada satu temperatur tertentu. Pemaduan kedua logam tersebut, akan menurunkan titik awal pembekuan. Karena masing-masing saling menyebabkan penurunan titik awal pembekuan, maka garis yang menunjukkan awal pembekuan (*liquidus line*) akan memperlihatkan suatu titik minimum, yaitu titik yang disebut *eutectic*. Paduan pada komposisi ini disebut komposisi *eutectic*. Logam paduan Al-Si memiliki struktur *eutectic* yang berada di sela dendrit dan merupakan campuran yang halus (Suherman, 1987).



Gambar 2.1. Diagram phase binary Al-Si

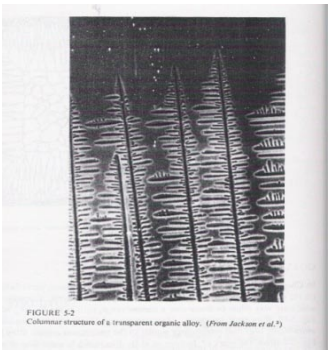
Diagram fasa paduan Al-Si ditunjukkan pada gambar 2.1. Diagram tersebut menunjukkan komposisi *hipoeutectic* yang berada disebelah kiri komposisi *eutectic*. Paduan Al-Si mempunyai komposisi *hipoeutectic* yang lebih didominasi warna putih sebagai penampakan aluminium.

Komposisi *hypereutectic* paduan Al-Si berada disebelah kanan komposisi *eutectic*.Silicon primer (hitam) makin banyak dengan makin tingginya kadar Si.

2.2.2. Proses Solidifikasi Logam Paduan.

Proses pembekuan coran dimulai dari bagian logam yang bersentuhan dengan cetakan, yaitu ketika panas dari logam cair diambil oleh cetakan sehingga bagian logam yang bersentuhan dengan cetakan itu mendingin sampai titik beku, kemudian inti kristal tumbuh. Bagian dalam dari coran mendingin lebih lama dari pada bagian luar, sehingga kristal-kristal tumbuh dari inti asal mengarah ke bagian dalam coran dan butir-butir kristal tersebut berbentuk panjang-panjang seperti kolom yang disebut struktur kolumnar. Struktur *equiaxed* terjadi karena laju pendinginan yang sangat tinggi. Struktur tersebut memperkecil kemungkinan terjadinya makro segregasi (Rusli, 1995).

Pembekuan searah (*Unidirectional Solidification*) adalah suatu metode untuk mengarahkan pertumbuhan butir menjadi kolumnar dengan menggunakan aliran kalor secara langsung (Smith dan Beeley,1967). Gambar 2.2 menunjukkan struktur kolumnar dendrit yang dihasilkan dari proses pembekuan searah.



Gambar 2.2 Struktur kolumnar dendrite (Sindo Kou, 1987)

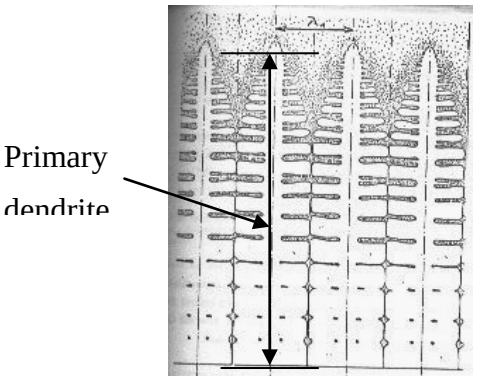
Proses pembekuan terjadi melalui mekanisme pengintian dan pertumbuhan. Proses pembekuan paduan ditinjau dari komposisinya terdiri dari empat jenis, yaitu pembekuan paduan fasa tunggal, pembekuan fasa *eutectic*, pembekuan fasa dekat *eutectic* (*off-eutectic alloys*), dan pembekuan *peritectic*. Keempat jenis proses pembekuan tersebut menghasilkan struktur mikro paduan yang berbeda-beda antara lain struktur lamellar, struktur *eutectic*, struktur selular dendrit, dan struktur kolumnar dendrit. Keempat bentuk struktur mikro tersebut menghasilkan sifat mekanik yang berbeda pula.

Proses solidifikasi dari komposisi *eutectic* menunjukkan adanya keseimbangan antara dua lapisan paduan yang disebut sebagai struktur lamelar. Struktur ini berupa susunan lapisan-lapisan halus dan tipis. Pada struktur lamelar difusi yang terjadi hanya difusi jarak pendek.

Selular dendrit merupakan kombinasi antara struktur seluler dan dendrit. Struktur seluler terjadi karena adanya *constitutional supercooling*, struktur dendrit terjadi karena adanya konduksi panas laten gabungan. Bentuk selular dengan ujung semi-lingkaran akan berubah menjadi struktur dendrit dengan ujung berbentuk piramid. Struktur selular dendrit membentuk cabang dari jaring-jaring yang saling berhubungan satu dan lainnya.

2.2.3. Pengukuran *Area Fraction Primary Dendrite (AFP)*

Struktur kolumnar dendrit terdiri atas *primary dendrite* dan *secondary dendrite* seperti pada gambar 2.4. ***Area fraction primary dendrite*** adalah perbandingan antara luas *primary dendrite* terhadap luasan total pada material. Kekuatan tarik material akan meningkat seiring dengan peningkatan ***area fraction primary dendrite.***



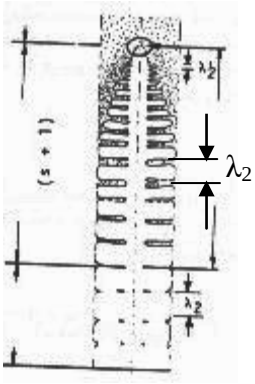
Gambar 2.4. *Primary dendrite*

Area fraction primary dapat dihitung dengan persamaan berikut (Underwood, 1985):

$$AFP = \frac{Jumlah\ luas\ tiap\ potongan\ primary\ dendrite}{total\ luas\ daerah\ uji} x100\% \text{.....(4)}$$

2.2.4. Pengukuran *Secondary dendrite Arm Spacing (SDAS)*

Secondary dendrite adalah bagian dari struktur kolumnar dendrit dan merupakan cabang dari *primary dendrite* seperti ditunjukkan pada gambar 2.5.



Gambar 2.5. *Secondery dendrite arm spacing*

Jarak antara *secondary dendrite* satu dengan yang lain disebut juga SDAS (*Secondary Dendrite Arm Spacing)***.** Besarnya SDAS dapat dihitung dengan metode perpotongan atau *intercept method* (Gunduz dan Cadirli, 2001) dengan persamaan sebagai berikut:

$$\lambda_2 = L/(n-1) \quad \ldots\ldots (5)$$

Dimana: λ_2 = *secondary dendrite arm spacing* (μm)

L = panjang sample yang diukur (μm)

n = jumlah secondary dendrite

III. METODOLOGI PENELITIAN

3.1. Bahan Penelitian

Bahan yang digunakan dalam penelitian ini adalah paduan Al-6%Si, Al-6%Si+Sr dan Al-6%Si+TiB.

3.2. Alat-alat yang digunakan

Peralatan yang digunakan dalam penelitian ini adalah:

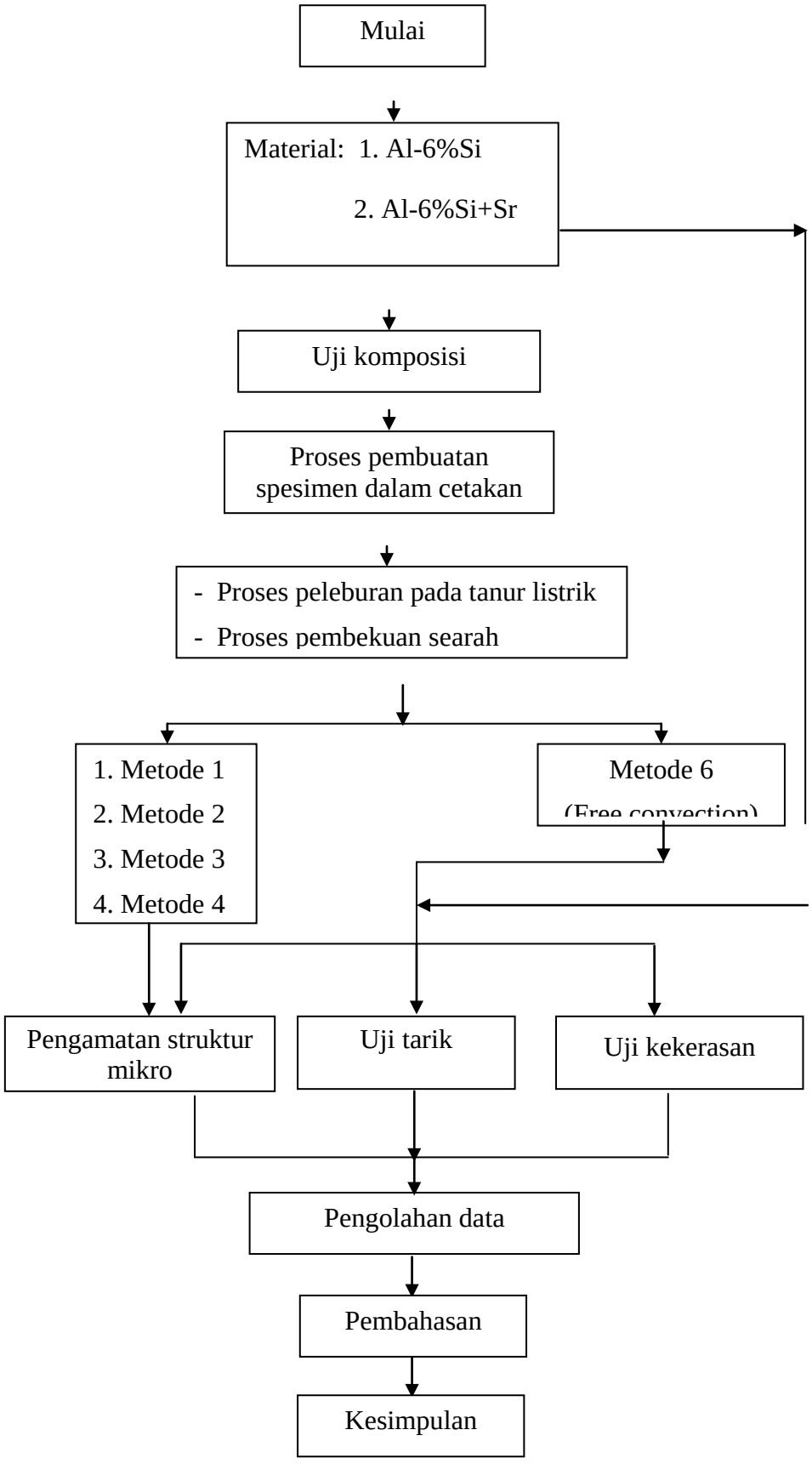
1. Tungku listrik
2. Termometer digital
3. Termokopel
4. Motor listrik
5. Potensiometer
6. Pipa stainles steel diameter 6 mm
7. Kawat baja
8. Mikroskop optik
9. Alat uji komposisi
10. Hardness tester
11. Pompa air
12. Bak air pendingin
13. Tanah liat (isolator)
14. Selang plastik

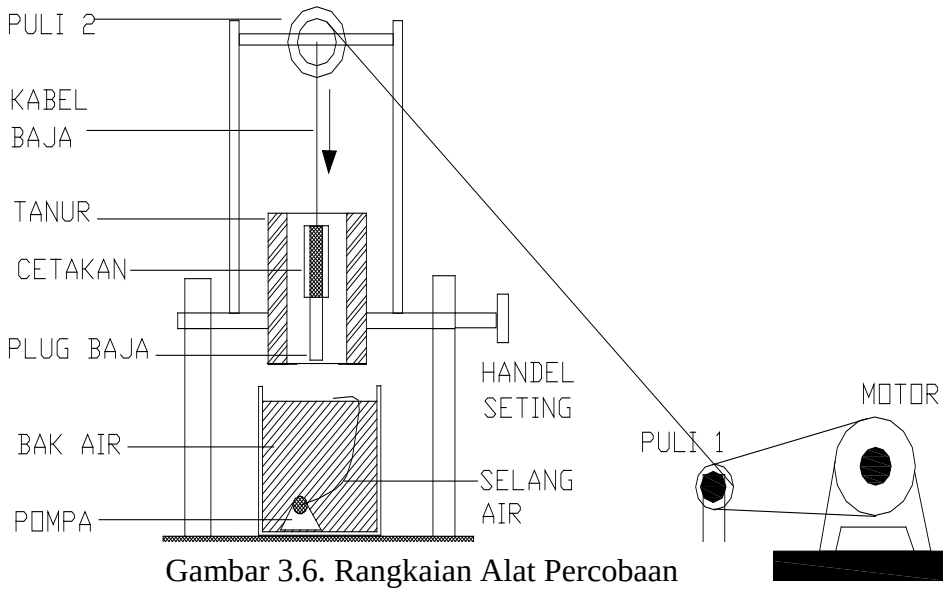
3.3. Pengujian

Pengujian yang dilakukan dalam penelitian ini adalah :

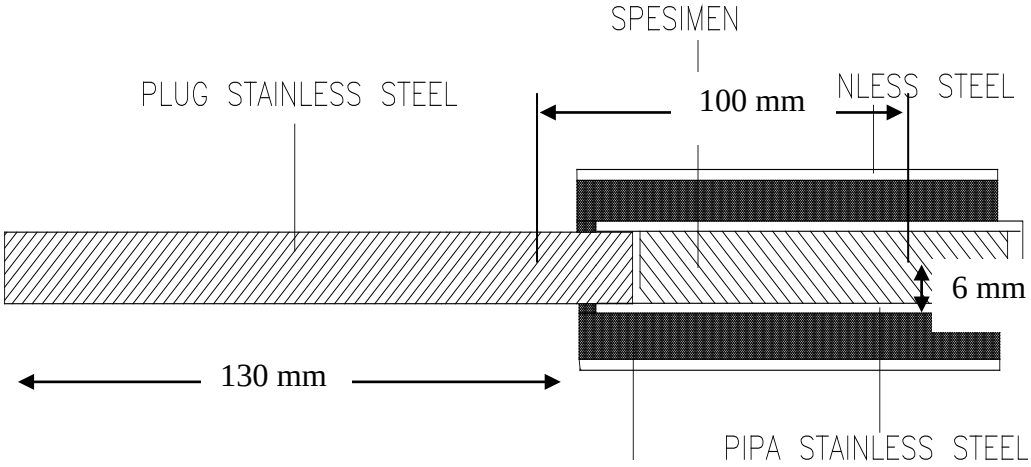
1. Pengujian komposisi kimia
2. Pengamatan struktur mikro
3. Pengujian kekerasan
4. Pengujian tarik

Diagram alir dari penelitian ini adalah sebagai berikut:


Mulai
Material: 1. Al-6%Si
2. Al-6%Si+Sr
Uji komposisi
Proses pembuatan spesimen dalam cetakan
- Proses peleburan pada tanur listrik
- Proses pembekuan searah
1. Metode 1
2. Metode 2
3. Metode 3
4. Metode 4
Metode 6
(Free convection)
Pengamatan struktur mikro
Uji tarik
Uji kekerasan
Pengolahan data
Pembahasan
Kesimpulan



Gambar 3.6. Rangkaian Alat Percobaan



Gambar 3.7. Model cetakan

IV. HASIL DAN PEMBAHASAN

4.1. Komposisi Kimia

Tabel 4.1, 4.2 dan 4.3 menunjukkan komposisi paduan Al-6%Si sebelum dan sesudah penambahan Sr atau TiB.

Tabel 4.1 Komposisi kimia paduan Al-6%Si

Komposisi paduan Al-6% Si												
Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Ni	Pb	Sn	Sr	Al
6.04	0.74	0.46	0.07	0.103	0.674	0.01	0.01	0.04	0.08	0.01	-	91.68

Tabel 4.2 Komposisi kimia paduan Al-6%Si+Sr

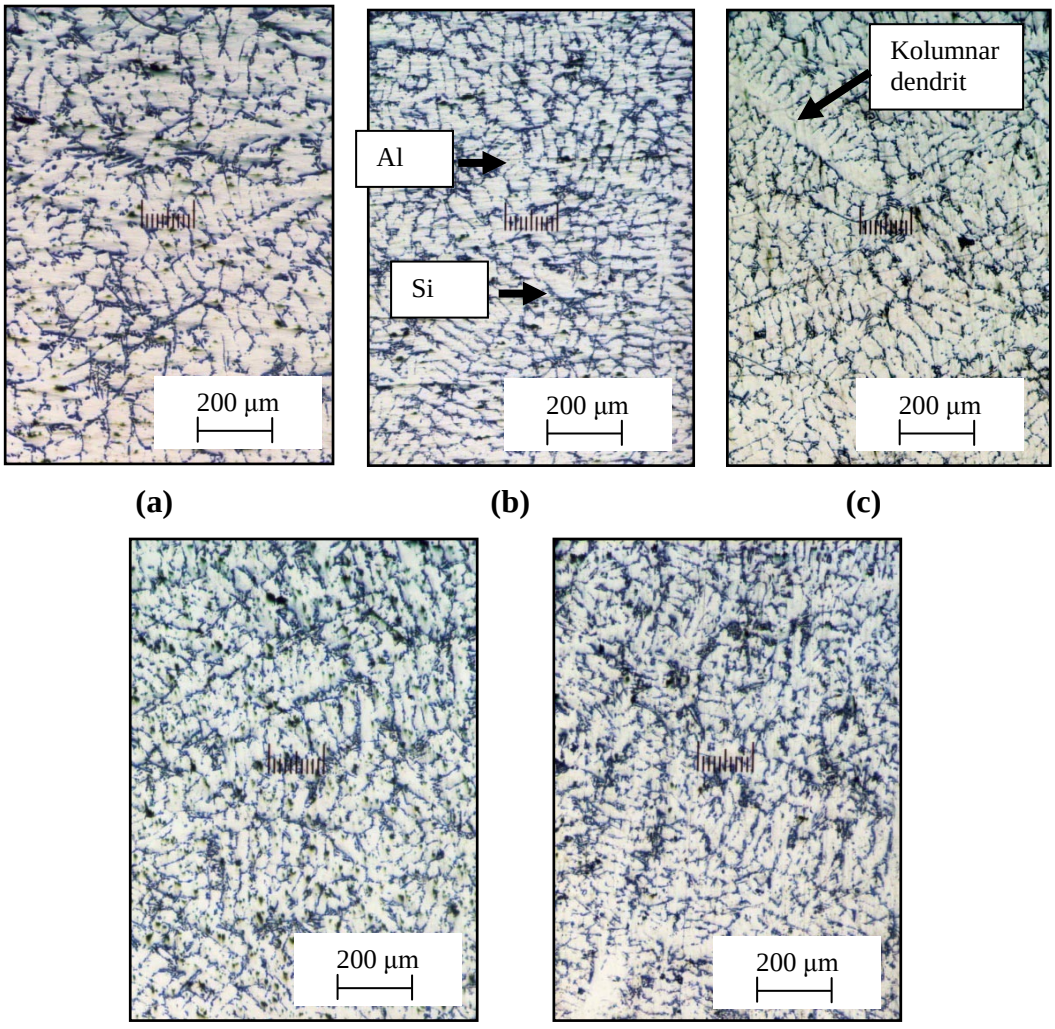
Komposisi paduan Al-6% Si+Sr												
Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Ni	Pb	Sn	Sr	Al
5.90	0.74	0.35	0.07	0.149	0.60	0.07	0.01	0.03	0.08	0.01	0.04	91.91

Tabel 4.3 Komposisi kimia paduan Al-6%Si+TiB

Komposisi paduan Al-6% Si+TiB												
Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Ni	Pb	Sn	Sr	Al
5.99	0.86	0.46	0.09	0.149	0.60	0.11	0.01	0.03	0.08	0.01	-	91.61

4.2. Pengamatan Struktur Mikro

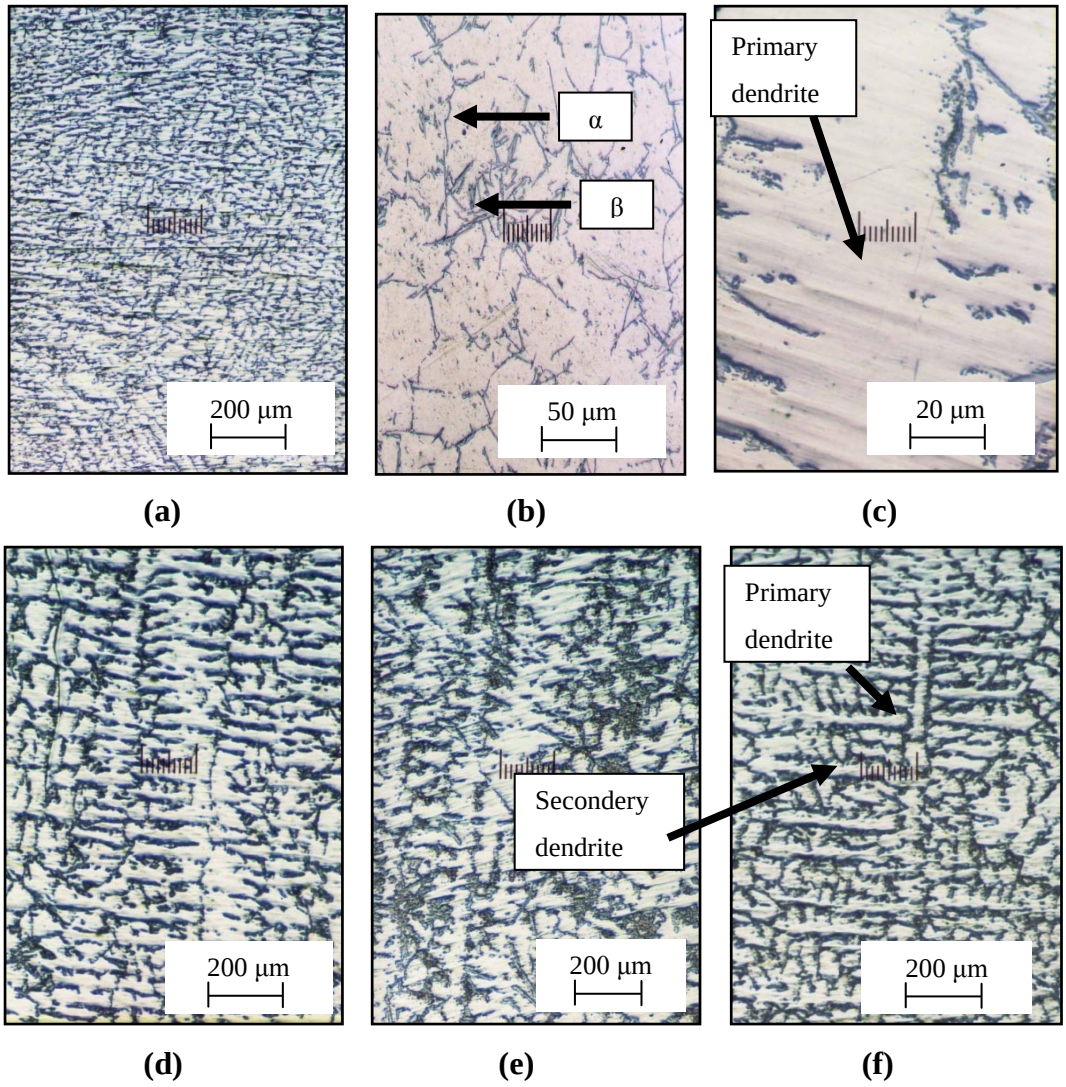
4.2.1. Paduan Al-6%Si metode 1 sampai 5



Gambar 4.1. Struktur mikro paduan Al-6%Si setelah proses pembekuan searah (a) Metode 1 (perbesaran 50X) (b) Metode 2 (perbesaran 50X) (c) Metode 3 (perbesaran 50X) (d) Metode 4 (perbesaran 50X) (e) Metode 5 (perbesaran 50X)

Gambar 4.1. (a) menunjukkan struktur mikro paduan Al-6%Si yang telah dilakukan proses pembekuan searah dengan metode 1, yaitu dengan pendinginan udara ruang. Metode ini menghasilkan struktur butir equiaxed dendritik dengan ukuran butir yang besar. Struktur ini terbentuk karena proses laju pembekuan yang lambat akan tetapi tidak satu arah. Pada gambar 4.2 (b) dan 4.2 (c) juga tampak struktur mikro paduan al-6%Si yang telah dilakukan proses pembekuan searah dengan metode 2 dan 3. struktur kolumnar dendritik sudah terbentuk meskipun arahnya belum seragam. Hal ini terjadi karena proses pembekuan masih belum satu arah. Pembekuan terjadi dari dinding cetakan dan juga dari pangkal cetakan, sehingga orientasi struktur kolumnar yang terbentuk tidak seragam. Gambar 4.2 (d) dan 4.2 (e) menunjukkan struktur kolumnar dengan orientasi yang lebih seragam. Struktur ini mempunyai *primary dendrite* dengan ukuran tidak begitu panjang dan beberapa bagian tidak satu arah.

4.2.2. Paduan Al-6%Si metode konveksi bebas

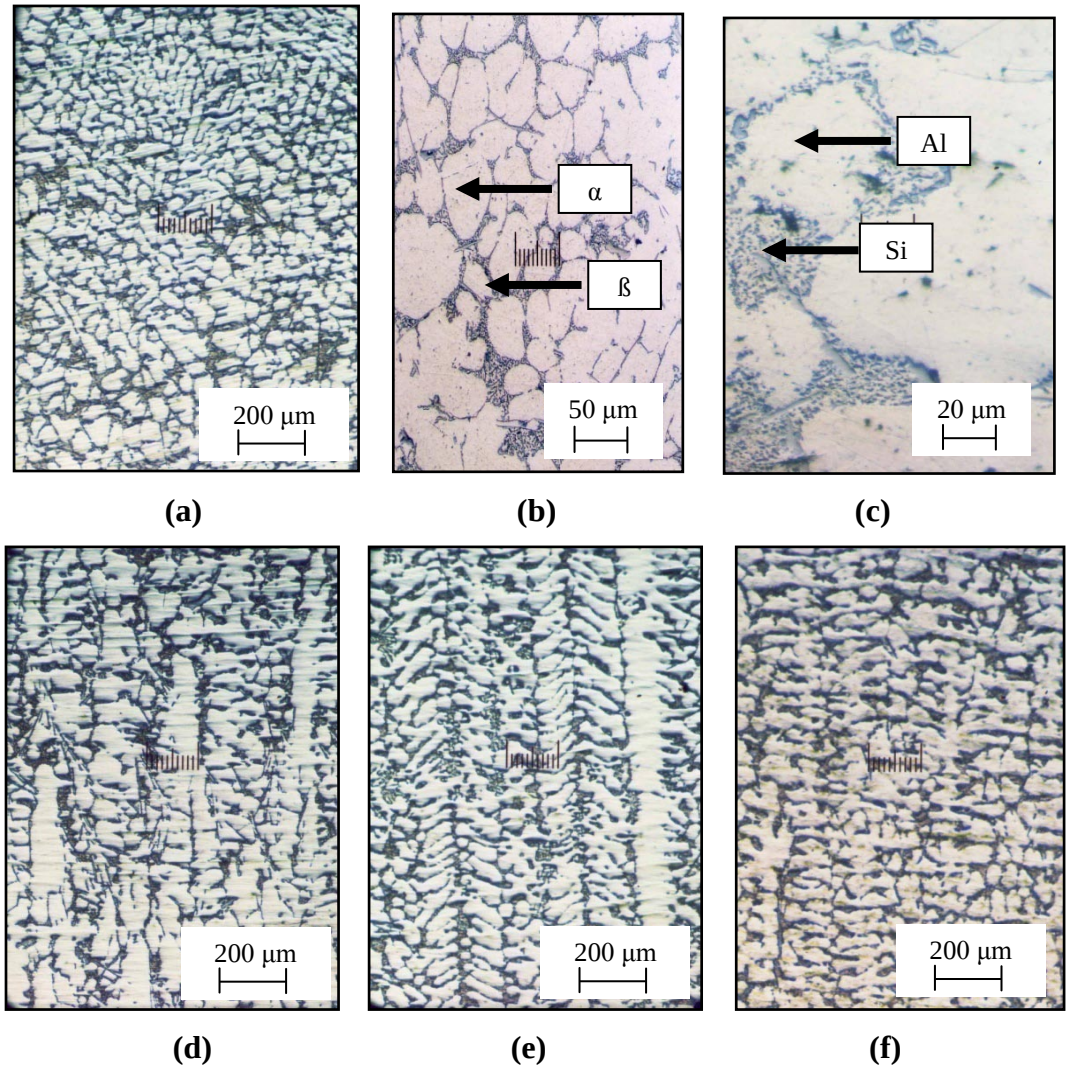


Gambar 4.2. Struktur mikro paduan Al-6%Si (a) Sebelum dilakukan pembekuan searah (perbesaran 50X) (b) Sebelum dilakukan pembekuan searah (perbesaran 200X) (c) Setelah dilakukan pembekuan searah (perbesaran 500X) (d) Setelah dilakukan pembekuan searah (jarak 20 mm dari pangkal perbesaran 50X) (e) Setelah dilakukan

pembekuan searah (jarak 40 mm dari pangkal perbesaran 50X) (f) Setelah dilakukan pembekuan searah (jarak 60 mm dari pangkal perbesaran 50X).

Struktur mikro paduan Al-6%Si sebelum dilakukan pembekuan searah ditunjukkan pada gambar 4.2 (a) dan 4.2 (b), tampak struktur butir masih berupa *equiaxed.* Gambar 4.2 (d), 4.2 (e) dan 4.2 (f) menunjukkan struktur kolumnar dengan perbesaran yang sama. Struktur ini didapatkan dari proses pembekuan searah dengan sistem pendinginan konveksi bebas *(free convection)*. Proses ini menghasilkan struktur kolumnar memanjang dengan orientasi yang seragam seperti yang dikemukakan oleh Axmann (1983). Struktur ini terbentuk karena adanya proses pembekuan 1 dimensi sehingga proses pertumbuhan butir mengarah ke satu sisi dengan arah yang seragam. Gambar 4.3 (c) memperlihatkan morfologi *primary dendrite* dengan perbesaran yang berbeda.

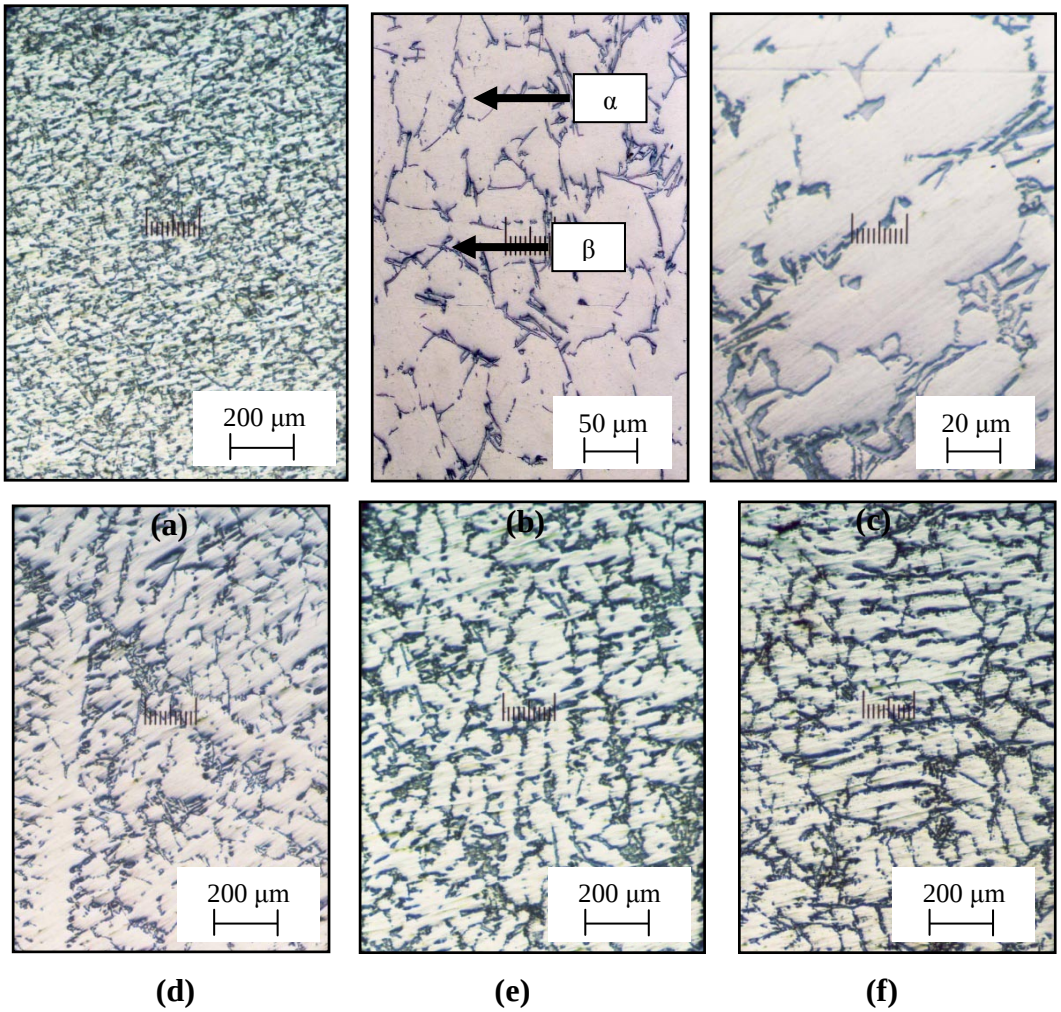
4.2.3. Paduan Al-6%Si+Sr metode konveksi bebas



Gambar 4.3. Struktur mikro paduan Al-6%Si+Sr (a) Sebelum dilakukan pembekuan searah (perbesaran 50X) (b) Sebelum dilakukan pembekuan searah (perbesaran 200X) (c) Setelah dilakukan pembekuan searah (perbesaran 500X) (d) Setelah dilakukan pembekuan searah (jarak 20 mm dari pangkal perbesaran 50X) (e) Setelah dilakukan pembekuan searah (jarak 40 mm dari pangkal perbesaran 50X) (f) Setelah dilakukan pembekuan searah (jarak 60 mm dari pangkal perbesaran 50X).

Struktur paduan Al-6%Si+Sr sebelum dilakukan pembekuan searah ditunjukkan pada gambar 4.3 (a) dan 4.3 (b). *Modifier* Sr mengubah struktur silikon eutektik dari bentuk serpih *(platelike)* ke berbentuk berserabut *(fibrous)* seperti yang dikemukakan oleh Flemings, (1974), Dahle dkk, (2000), McDonald dkk, (2004). Setelah dilakukan proses pembekuan searah tampak struktur kolumnar dengan orientasi yang seragam seperti pada gambar 4.3 (d), 4.3 (e) dan 4.3 (f). Hal ini seperti yang dikemukakan oleh Kim dkk, (2000) bahwa modifikasi paduan dengan menambahkan 0,02% Sr dan 0,2% Ti dapat memperbaiki orientasi butir dalam struktur mikro. Modifikasi silikon eutektik pada struktur kolumnar tampak lebih jelas seperti ditunjukkan pada gambar 4.3 (c).

4.2.4. Paduan Al-6%Si+TiB metode konveksi bebas



Gambar 4.4. Struktur mikro paduan Al-6%Si+TiB (a) Sebelum dilakukan pembekuan searah (perbesaran 50X) (b) Sebelum dilakukan pembekuan searah (perbesaran 200X) (c) Setelah dilakukan pembekuan searah (perbesaran 500X) (d) Setelah dilakukan pembekuan searah (jarak 20 mm dari pangkal perbesaran 50X) (e) Setelah dilakukan pembekuan searah (jarak 40 mm dari pangkal perbesaran 50X) (f) Setelah dilakukan pembekuan searah (jarak 60 mm dari pangkal perbesaran 50X).

Gambar 4.4 (a) dan 4.4 (b) menunjukkan paduan Al-6%Si+TiB sebelum dilakukan pembekuan searah. Penambahan TiB sebagai penghalus butir sangat berpengaruh terhadap dimensi butir, sehingga ukuran butir menjadi lebih kecil. Hal ini bisa dilihat pada gambar 4.4 (b) dan 4.4 (c)

jika dibandingkan dengan ukuran butir pada gambar 4.2 (b), 4.2 (c), 4.3 (b) dan 4.3 (c) dengan perbesaran yang sama. Sifat TiB sebagai penghalus butir sangat berlawanan dengan tujuan proses pembekuan searah untuk membentuk butir yang memanjang, sehingga sulit didapatkan struktur kolumnar yang bagus. Struktur kolumnar yang tidak satu arah dan lebih didominasi oleh struktur *equiaxed* ditunjukkan pada gambar 4.4 (d), 4.4 (e) dan 4.4 (f).

V. KESIMPULAN DAN SARAN

5.1. Kesimpulan

Berdasarkan hasil penelitian dan studi literatur, dapat diambil kesimpulan sebagai berikut:

1. Proses pembekuan searah pada paduan Al-6%Si mengubah struktur butir *equiaxed* menjadi struktur kolumnar.
2. Penambahan Sr pada paduan Al-6%Si yang dilakukan proses pembekuan searah dapat memperbaiki orientasi butir kolumnar menjadi lebih seragam.
3. Penambahan TiB sebagai penghalus butir menyebabkan dimensi butir menjadi lebih kecil, sehingga mempersulit pembentukan struktur kolumnar.

5.2. Saran

Saran- saran yang dibutuhkan untuk penelitian selanjutnya:

1. Perlu dilakukan penelitian yang sama dengan memvariasikan laju pendinginan dan gradien temperatur dengan menggunakan data akuisisi, sehingga bisa diketahui pengaruhnya terhadap struktur mikro dan sifat mekanis.
2. Perlu dilakukan penelitian yang sama dengan ukuran spesimen yang lebih besar dengan laju pendinginan yang lebih lambat, sehingga bisa dilakukan pengujian mekanis yang lebih variatif.
3. Perlu dilakukan penelitian yang sama dengan memvariasikan komposisi solikon sehingga bisa diketahui komposisi yang optimal untuk dilakukan pembekuan searah.

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SOFT SKILL BASED LEARNING MODEL IN FOREIGN COLLEGE PRACTICUM

Dina Ampera

ABSTRACT

Learning soft skills have become critical needs in education and should be incorporated into the learning curriculum. But it's also important to realize that to change the curriculum is also not an easy thing. Soft skills education should ideally not only be applied only to students but also for educators. Educators should provide education charges soft skill in the learning process. Soft skills should be comprehensively incorporated into the educational curriculum.

Learning soft skills coaching mentality relies on for students to adjust to the realities of life. While hard skills are the ability to absorb students of science or theory related to the power of reason against something (IQ). Hard skills will be obtained from the process of understanding, and deepening memorize material from models of learning that has been usually done. The ability of hard skills each student can be judged from the results obtained achievement each semester. Development of soft skill in learning should be based on real life, higher-order thinking, student activities, applicable, comprehensive assessment, and establishment of human beings with common sense and are characterized by: a problem-based learning, authentic instruction, relevance-based teaching, project-based learning, learning-based employment, service-based learning, and learning cooperatively.

Keywords: Soft skills and Learning.

INTRODUCTION

Attention is now not only education leads to academic ability but also balanced with the ability of soft skills. Many educators lack the ability to trick soft skills of students in teaching and learning activities so that if the learning activities become boring. Many skills soft skills important in learning, particularly how student attitudes and actions when faced with learning problems, deal with the pressure before the exam, develop partnerships and develop creative thinking. All of these capabilities can be developed through an integrated learning activities for all interactive lesson conducted directly with the touch of psychosis.

It is a reality if it was realized that the skills the education system in Indonesia is currently in charge hardskills oriented, often ignoring the elements of soft skills. When considering that the real determinant of a person's success was more due to the elements of soft skills, it is necessary to determine how much it should charge soft skills in the educational curriculum.

Practicum learning model today is still characterized by a classical teacher centered learning so that learning objectives are achieved only aspects of cognitive, affective and psychomotor aspects while not achieved. For that, the learning model is not in accordance with the competencies to be achieved in a practicum course. Bertititik departure of problems, a practical learning model should be changed to shoftskills-based learning model which is characterized by student centered learning, namely shoft skill-based learning model, in which this model uses an active approach, multi-method multi-source teaching and learning.

Technical ability is hardskills learned in class and in the laboratory, those who study diligently, diligently, and diligently will obtain a good technical ability, reflected one of them with high value. An example is the ability to program. Companies can immediately see whether a prospective

employee can actually make the program when tested. The problem is, have high technical ability alone is not considered sufficient.

Many industries are complaining that the graduates are now much less have a good attitude, for instance, can not meet the employment contract, can not determine their own salaries first, but after two months of work they complain about low salaries, less able to work together, no leadership, personal integrity is questionable, less ethical, and so forth, all of which can not be traced from the high scores and graduation on time alone. Good attitude, such as integrity, initiative, motivation, ethics, work together in teams, leadership, willingness to learn, commitment, listening, tough, flexible, oral communication, honest, logical argument, and others, who were asked by the employer is the attribute of soft skills . Soft Skill is defined as "personal and interpersonal behaviors That develop and maximize human performance (eg coaching, team building, decision making, initiative). Soft skills do not include technical skills, Such as financial, computer or assembly skills "(Berthal, 2003).

Suprayitno (2007) likens between hard skills and soft skills such as the concept of Yin and Yang, which can not be separated for one's career to success. Knowledge of soft skills is nothing but one's ability to be beradasekolahasi and communicate well in an environment where it is located. This is important, because many of the graduates of high perdosenan when asked to speak, convey an idea or ideas and presenting his work, not ready. In modern management found that the success of one is not only determined by the intellect alone, but also soft skills possessed. This paper will review the possibility of integration of soft skills in preparing a learning system in human resources, to navigate the work environment in the community, especially to meet the educational development in Indonesia. It is expected that with the integration of soft skills students will be able to deliver success.

DISCUSSION

1. CONCEPT OF SOFT SKILL

Soft skills are the types of skills are more related to the sensitivity of one's feelings towards the surrounding environment. Because the soft skills associated with psychological skills, the impact of a more abstract but still can be felt such as polite behavior, discipline, perseverance, ability to work together, help others, and so forth.The concept of soft skills is a sociological term that represents the development of emotional intelligence a person who is a collection of personality traits, social sensitivity, communication, language, personal habits, friendliness, and optimism that characterized the relationship with other people. Soft skills complement the hard skills, hard skills which is a representation of a person's IQ potential associated with the technical requirements of work and several other activities.

Emotional Intelligence (EI) covers two aspects of intelligence that is (a) to understand ourselves, objectives, intentions, responses, behavior and all, (b) understand others, and their feelings. Emotional intelligence has five domain include:

1. Knowing the emotional self.
2. Managing emotions themselves.
3. Motivating yourself.
4. Recognize and understand the emotions of others.
5. Managing relationships with other people how to manage emotions.

Emotional Intelligence (EI) includes various other branches of behavioral, emotional and communications theories, such as NLP (Neuro-Linguistic Programming), Transactional Analysis, and empathy. The process and results of development of emotional Intelligence (EI) also contains many elements that can be used to reduce stress for individuals and organizations, by reducing

conflict, improving relationships and understanding, and promote stability, continuity and harmony Soft skills alone is defined as the ability of outside skills technical and academic. Broadly speaking, soft skills can be classified into two categories: intrapersonal and interpersonal skills.

Intrapersonal skills include self-awareness (self-confident, self-assessment, trait and preference, emotional awareness) and self skill (improvement, self control, trust, worthiness, time / source management, proactivity, conscience). While interpersonal skills include social awareness (political awareness, developing others, leveraging diversity, service orientation, empathy and social skills (leadership, influence, communication, conflict management, cooperation, team work, synergy).

Skills soft skills when someone entering the workforce is not something stagnant. This ability can be honed and improved in line with work experience. There are many ways to improve the soft skills. Soft skills can be sharpened and improved by following the training and management seminars. However, one powerful way to improve the soft skills is to interact directly and do activities with others who are commonly referred to as learning by doing.

SOFT SKILLS DEVELOPMENT IN LEARNING PRACTICUM

Formal institutions such as schools are more likely to simply as media that is most conducive to hone one's skills soft skills. This is because the soft skills learned through interaction with others and how people deal with problems in his life. Soft skills need to be sharpened can be grouped into six categories namely: (a) oral and written communication skills (communication skills), (b) organizational skills (organizational skills), (c) leadership (leadership), (d) the ability to think creative and logical (logic and creative), (e) resistance to pressure (effort), (f) teamwork and interpersonal (group skills) as well as work ethics (ethics). Person's success is not determined solely by the knowledge and hardskills, but the skills to manage themselves and others (soft skills). So, soft skills is the ability of students to apply theoretical knowledge of God, other human beings and nature in the form of methods or behavior toward herself and other living creatures or nature, such as how keiklasan worship, respect for parents, respect elders, refused to budge, behave, how I talk and others. The ability of soft skills can also be seen with how to socialize, create on, respect for other living things, including respect for nature.

Penekananan on soft skills is the concept of learning that help teachers to link between the material taught is relevant to the situation and close to the students and encourage students able to perform synthesis of the knowledge possessed by the application in daily life such as constructivism, discover, ask questions, learn from others, modeling, reflection and assessment of the truth.

Through this approach and strategy, learning to develop students' soft skills. Soft skills that appear in student learning as a result of this implementation include: critical thinking, willingness to learn, motivation, communication, creativity, problem solving, working together, independent, logical argument, lead, develop themselves. Sharpening soft skills can also be implemented through the character building that is by the formation of character as the first step that can be used to establish a prima beings so it is expected to have excellent soft skills as well.

Education dimensional character building has several pillars in its application, among others, is respect, responsibility, fairness, caring and citizenship. Application development of character (character building) in education to provide another nuance in education because not only the evaluation indicators based on cognitive value but also in terms of affective and psychomotor even students.

The process of learning through character development was first done through the introduction of good character are accepted in public life. Once students know and understand good character is the student mengkorelasikannya with everyday life both in learning and in the home or community environment. Therefore it is necessary for the development of science as widely as possible. In their studies diperbolehkann not stop learning and this step is referred to as education for life.

Representation system that can be done to provide flexibility for each student educational development is to use the block system within the framework of competency-based curriculum, where the block system is changing the college activities that used to be centered to the lecturer (teacher center), was changed to the student (student center) and In return. This is instrumental in realizing the soft skills.

Soft skills are not only directly used as subjects in the curriculum, but more importantly is the need to be integrated through the course. With this integration is expected there will be mutual respect for and by all the participants learning. In its application, will be efficient if the soft skills have first carried out by lecturers, who would then be transmitted to students. Through lectures, lecturers and students are expected to communicate well and gave an example of good behavior and attitude as well.

Soft skill attributes actually possessed by everyone, but in the number and different levels. This attribute can also be developed into a person's character. How to change or develop it? No other does not is not, should be honed and practiced by every individual who study or wish to develop it. One event that was good enough to develop soft skill is through learning with all its activities and student organizations. Soft skills: "That Personal and interpersonal behaviors develop and maximize human performance (e.g. coaching, team building, decision making, initiative). Soft skills do not include technical skills, such as financial, computer or assembly skills "(Berthal).

Soft skills are special abilities, such as covering social interaction, technical and managerial skills. This capability is one thing to have every student in entering the workforce. Based on the data adopted from the Harvard School of Business, abilities and skills that are given on the bench learning, 90 percent were technical ability and the rest soft skills. In fact, the future is needed to face the world of work that is only about 15 percent capacity hard skills. From these data, he added, can pull the red thread that in the soft skills entering the workforce who have a more dominant role. To disseminate soft skills in students, a very influential factor was the beginning of the lecturers. Formulation development soft skill, lecturers must be able to be living example. From start to come on time, correcting the task, and so forth. Not the presentation and writing skills of students are still many that have not been good.

Lecturers should also be able to train students to be assertive, to dare to talk about ideas. The phenomenon of cheating students also should not be considered unusual, this makes honesty and ethical factors in soft skills. View in Indonesia, corruption is so flourishing, because people are accustomed to be dishonest since the days of school.

Soft skills provided to students can be integrated with learning materials. According Saillah (2007), materials necessary to develop soft skills to students, none other than the planting of an honest attitude, communication skills, and commitment. To develop soft skills by learning, planning needs to be done involving the lecturers, students, alumni, and the world of work, to identify the development of soft skills that are relevant.

How to assess students' soft skills? Evaluation with paper and pencil with a single answer (convergent) is not enough. It should be equipped with a model of divergent questions with answers varied. When students identify the information, it is possible the results vary and it's all true. Similarly, when students express opinions. Components of self-awareness is also closer to the affective realm, so that evaluation cannot be only with the test. Required format of observation to determine if students are already represented in the action live the everyday life. Performance tests and observation sheet is also necessary to know the performance of the students in doing the task/test and daily behavior. The substance of the exam should be associated with real problems, so it can be a form of authentic evaluation is the most authentic evaluation is not a shadow that is problem based.

Another way to assess soft skills possessed by students can be performed using an in-depth interview techniques and comprehensive approach to behavioral interview. With behavioral interviewing, graduate students are expected to not only have the hard skills but also soft skills supported by good.

Many surveys have been done and revealed that universities graduates are needed in the workforce are graduates who not only have hard skills but also who has soft skill. Call it such as the ability to communicate and work in teams. Almost no jobs that do not need people who have this capacity. In general, hard skills defined as the ability to master science and technology, technical skills related to the field of science. Such as a mechanical engineer should master the science and engineering machinery. While soft skills are defined as a person's ability in dealing with others (interpersonal skills) and ability to regulate / manage themselves (intrapersonal skills).

SOFT SKILL DEVELOPMENT MODEL

The steps for preparing the development of soft skills can be done in various ways:

1. Indetifikasi soft skills, identification of any soft skills needed by graduates of your department. to get this, it can be done by requesting input from the user industry alunmi or graduates.
2. Definition of soft skills, after the soft skills needed are identified, then "choose" soft skills that are "most" important curriculum adopted in your departments.
3. Program development, (1) written curriculum, is done by entering the soft skills that have been specified into the learning design. thus student mastery of certain soft skills should be included in the assessment aspect of the course. (2) the hidden curriculum, this was done informally through faculty-student interaction. professors as role models. can also be done by creating an academic atmosphere within your department. (3) Co-curriculum, take advantage of activities such as internships (internship), work practices (4) Extra-curriculum, student activities involve the unit as a place to train soft skills these students.
4. Evaluation of soft skills, determine the appropriate measure to assess soft skills talah you input into the curriculum of department.

Besides has ability in their respective fields, a recent college graduate is required to have certain attitudes and behavior in accordance with the field work occupied. In the current intense competition, it is not negotiable hardskills and soft skills that should be in line and consistent in its development in college as a printer and superior resources are formidable. If since the beginning of students equipped with knowledge about the soft skills are sufficient and even been used to practice it in everyday life then their chances to become successful people in society will be even greater.

Need a lot of examples that students see in the college environment. This example from college leaders, faculty and supporting staff who become frontliners who deal directly with students. If the student accustomed to be treated well and respected, sooner or later they will be good stewards in the community.

Soft skills are skills a person in dealing with others (including with itself). Attribute soft skills, thereby covering shared values, motivation, behavior, habits, character and attitude. The attributes of these soft skills possessed by every person with different levels, influenced by the habits of thinking, say, act and behave. However, this attribute can change if the concerned will change this by way of practice to get used to new things.

When observed from the fact that there is, both from informal conversations as well as search results or formal study, the ratio of soft skills and hardskills needs in the world of work/effort is inversely proportional to its development in college. Facts show that people who bring or defend in a success in employment is 80% determined by the mind set he has and 20% is determined by technical skills. However, the reality in college or our education system today, soft skills are given only an average of 10% only in its curriculum.

As stated in the book softskill development, that development of soft skills is only effective if the transmission. One of them by making the faculty role model for students. For example, if you will uphold the discipline of students, it is a good example can be demonstrated to students by teachers. If

lecturers want students to come on time, then the faculty must first come to class. When students are asked to always maintain the cleanliness of the classroom, the teacher must be able to erase the board after finishing college. If the professor promised to return the assignment within three weeks, then do not get back 5 weeks later. Role models can be demonstrated with each other lecturers edifikasi with colleagues in front of students. Edifikasi derived from the word to edify is to give awards at the same time the proportion of peers.

Transmission of how both can be done by giving a moral message at all times face to face either at the beginning of open lectures or closing the meeting. This method is called the message of the week (MOW). The message conveyed to the form of words pearls from various sources in the sense berkehidupan, or animation from the web site that supports the Internet. This method is also used in the process of learning skills is also done "sharing" of the students themselves. There are many methods that may be done in integrating soft skills, it is necessary to dig the potential that exists. It may be the strategy and technique will vary depending on the college's vision, soft skills possessed by current students and hope development of students' soft skills, soft skills needs of the users of graduates as well as infrastructure facilities owned universities.

- Higher Education makes statement soft skills of graduates that are integrated with the competence of graduates, who will be the brand image of graduates.
- Higher Education identified the ability of soft skills will be developed by new students.
- College planning for each level, so that reflected the desired character of development process until students graduate.
- Higher Education makes the program unique breakthrough by taking into account existing resources in the development of soft skills. What needs to be done by students.
- Create a clear goal in shaping the character (like imaged as what?)
- Actively interact and participate in student activities that focus on character formation.
- Having a role model of successful people, learn autobiography and replicate successful practices to life
- Diligent reading a book-laden personality development and apply them in daily life (how to communicate, respect, discipline, commitment, responsibility, and always honest).
- Active in the learning process as students can use participatory and multi-dimensional learning resources needs to be done by the lecturers.
- Create a statement of what competencies will be provided through a practicum course.
- Actively interact and participate in activities to construct science and technology by students and implementing student centered learning (SCL).
- Adaptive to changes in science and technology and is able to determine the scientific vision.
- Read a book-laden personality development and apply them in daily life (how to communicate, respect, discipline, commitment, responsibility, and always honest)
- Applying edifices attitude, transmit messages either (a quote) before or after the face-to-face with students.

EVALUATION OF SOFT SKILLS IN THE CONTEXT OF LEARNING

Soft skills are a set of capabilities that influence how we interact with others. Soft skills include effective communication, critical and creative thinking, team building, and other related skills capacity of individual personality. Soft skills have many benefits, such as career development and professional ethics. From the organizational side, soft skills have an impact on total quality management, institutional effectiveness and synergy of innovation. The essence of soft skills is an opportunity.

Success in a job does not only depend on the ratio and logic individual but also the capacity of humanity. The ability of human beings can liken Iceberg (Ice Berg). What appeared outside surface of the water are Hard skills Skill/Technical Skill, while capabilities that are under surface water and

has the biggest portion is the ability of Soft Skill. Soft skills an ability that is not visible and is often associated with emotions human. Many found the results of research showing the success of individuals in work is influenced by individual personality characteristics. The study would then lead to on questions such as whether the personality characteristics that contributed to its success in work. Of the many theories of personality, personality theory of five factors (five factors personality) is widely used to review the success in work. Five factors of personality is a description of the typical characteristics of a unique individual and relatively stable. The five factors include:

1. Personal Resilience (conscientiousness). Personal Resilience is indicated by the character of persistent, systematic, never give up, high motivation and resistance to the workload.
2. Extraversion. This personality type is characterized by developing relationships and communication skills that are effective, easy to get along, work together, actively, giving priority to cooperation, attractive and assertive (open).
3. Friendliness (agreeableness). This type is characterized by the attitude of friendly, humble, did not want to show the advantages, easy sympathy, warm, trustworthy and polite.
4. Stable emotions (emotion stability). This type is characterized by a calm attitude, not easily anxious and depressed, easy to accept, is not easily angered and confident.
5. open to experience. Individuals with this type of imaginative thinking, like's challenges, anti-establishment, creative, critical and have a great curiosity.

The five factors of personality are derived from many years of research conducted in a psychology study which is the essence of the personality characteristics

human. Of the five factors, personality factors and emotional stability are the greatest predictors of success in work in general (Barrick, 2001).
On the other hand the three other factors to be predictors of success is not straight, depending on the criteria of the job that embrace. For example extraversion more appropriate for jobs requiring interpersonal relationships or negotiations, individuals with the type of hospitality is more appropriate at a job that requires cooperative nature, this type of openness to experience more precisely in the position of research or creative team. Recent research found that the role of personality type on the success mediated by motivation. This means that if not supported by a strong motivation, the effectiveness of these roles to be reduced.

3. ELEMENT SOFT SKILLS

Soft skills have many variations on the elements contained therein. Here
This will explain some types of soft skills associated with success in the workplace on the basis of research results.

1. Emotional Intelligence. Through intensive research Goleman (1998) found that a person's success is not only supported by how smart a person to apply knowledge and demonstrate her skills, but how much will one be able to manage itself and interactions with others. Skills are called emotional intelligence. Emotional intelligence terminology was first introduced by Salovey and Mayer to express one's qualities, such as the ability to understand other people's feelings, empathy, and emotional adjustment to improve the quality of life (Gibbs, 1995). Emotional intelligence also includes a number of skills related to accurate assessments of the emotional self and others; and the ability to manage feelings to motivate, plan and achieve life goals.
2. Healthy Lifestyle. Marchand (2005) found that the money of millions of dollars wasted by the institution and society because of lack of productivity, health care, workplace accidents and employee absences in the work. Among the main supporters of these indicators is the lifestyle of individuals who are not healthy. University of Central Florida include the theme

of this healthy lifestyle as a target the development of soft skills for their students. Topics raised in the development includes nutrition, stress management, time management, cultural diversity, and drug abuse. The results showed that a healthy lifestyle affect high endurance, flexibility and a healthy self-concepts that affect the high participation in the community.

3. Effective Communication. Cangelosi and Petersen (1998) found that many students' failure in schools, communities and workplaces due to lack of skills in communication. In addition to communication skills contribute directly, indirectly, also found a role. Indirectly affect the level of communication skills confidence and social support which then continued its influence into success. Soft skills include many types and variations.

4. MEASUREMENT OF SOFT SKILLS

Soft skills is more dominated by the personality of the individual so that the procedure measurement are slightly different from the measurement of individual abilities component. Therefore, the measurement of soft skills will lead to the characteristics of internal nature and manifest in the individual self as an affective dimension, motivation, interests, or attitudes. Measurement of personality is divided into two types, namely self-reporting (self-report) and projection (projective). This paper will explore the types of self-report measurements.

1. Self Report.

   As a test sample which is defined as a set of responses that indicate the attributes measured at the individual, the measurement of soft skills also resulted in a number of responses from individuals who show the level of soft skills possessed. Self report
   is a set of stimulus in the form of statement, question or a list of descriptions of self-responded by the individual.
   The statement is derived from measuring the domain of theoretical conceptual nature after going through the process of operating an indicator. Once the domain measurement and indicators have been defined, the process of preparing the next measurement is a writing instrument items (wording). For example, measuring the level of individual extraversion realized through the statement "I am pleased to be interacting with many people" or "I'd rather work together than by working alone." This item is then responded with a continuum from strongly agree to strongly disagree.
   Various design of measurement instruments can be applied in the measurement of soft skills, such as model Likert, Guttman or semantic differential with a few modifications to the response type and amount of alternative responses. Type responses in general lead to agreement (agree-disagree) subject to the statement given, but can modified into the evaluation (good-bad), potency (strong-weak) or the frequency of behavior (Often-never). Number of responses typically moves on a scale of five choices to modified into three or four choices.
   Results showed that subjects can give a deceptive answer (Faking) on self-report measures with the aim to give a positive impression about him. But by using the writing of items and design appropriate measurements and measurement conditions that are not pressing will make the subject will respond in accordance with the conditions. The results Widhiarso and Suhapti (2008), found there were characteristics of items that susceptible and resistant to a deceptive response. For example, items that are verifiable are more resistant to trick the response compared with items that cannot be verified. On the other side of the item scoring procedure can also improve resilience to withstand the measurement of affective responses hoax. Ipatieff scoring procedure is proven to reduce the potential subjects to give a deceptive response.

2. Checklist

   Checklist is a type of affective or behavioral measure which contains a number of indicators, usually adjectives or behavior completed by an assessor (rater). Checklist more widely used to

measure the psychological aspects that appear (overt), such behavior. Just as self-reports, preparation of the items on the checklist was also preceded the operational aspects of measurement domain into a set of conceptual nature the indicators are operational. On the measurement of soft skills, more appropriate checklist used to measure the dimensions of student behavior such as how to present the paper, how to interact with others, or a strategy to overcome the problem. Engineering peer evaluation among students usually uses the checklist.

3. Performance Measurement
   Some of the many soft skills associated with such actual relative abilities effective communication, problem solving, creative thinking or critical thinking so that measurement using a self report on a certain level is less relevant. Design appropriate to measure this component is a measurement of performance. Measurement performance is a measurement of the process or the result of individual performance against a given task. Scoring rubric is based lecturer who has made previously. Rubric is a scoring guide that contains performance criteria. Scoring can be done when the subject was at work or the work provided. Before applied to the subject, the instrument that made need to be evaluated quality indicated, data from instrument test soft skills. Measurement of soft skills students need to apply to each category of student, from freshman, sophomore and senior secondary.

MODEL-BASED DESIGN SOFT SKILL DEVELOPMENT

a. Planning Model Development

Learning plan is a step-by-step in determining the principal activity of learning strategies that aim to improve the quality of learning;

Table 1 Learning Strategy planning

Dimensions of Learning strategy	learning Planning Efforts
Organizing strategies	- Develop and create a syllabus, lesson plans and contract courses. (Each learning objective should not contain attribute soft skills) - Develop model-based learning soft skills and attributes and determine the most dominant soft skills to be applied in learning. (if you need to be trained) - Determine method of implementation of soft skills - Determine how and when to evaluate the attributes of soft skills.
Strategy to deliver learning	- Using various methods and delivery of learning - Using the media
Learning Management Strategy	- Provide motivation - Explain the purpose of competency to the students - Providing stimulus - Providing learning guidance - Creation of appearance

TRANSMISSION SOFT SKILLS THROUGH LEARNING PROCESS

1. Student Centered Learning

The learning process is undergoing a shift from content-based learning to competency-based. If the curriculum is implemented, it is not too difficult for students to transform themselves from the less competent to be the most competent. The changes referred to in SK 045/U/2002 minister, not merely change the list of courses, or arrangement of subjects, but the more essential is a change in the learning process, delivery and evaluation. Learning process from teacher centered to student centered learning. Education that focuses only on the content it should shift to the process.

Currently, learning is no longer centered on the lecturer but the students where they actively construct knowledge with teachers as facilitators, so the emphasis is no longer just in theory but also on how a job is done. Therefore, changes in the curriculum become an important presence by providing various learning experiences to students. SCL approach (Student Centered Learning) is an option in competency-based curriculum. Soft skills are not developed through one course, but in must be included in each course. If the attribute is soft skills developed verbal communication, then the learning process that uses presentations, discussions, discussion groups become necessary. If the cooperation will focus, then a lot of group assignments given. Currently, lecturers often give assignments in groups, but the results are less satisfactory, because the lecturers to submit fully to the students in groups without the assistance of the lecturer.

If the assignment is to create a writing group, then the professor should be in the middle group and directs attention to how they determine the coordinator, how they decide the topics to be written, how they divide the tasks and write together. Is there a synchronization is done after all the writings collected?. No wonder if writing is not organized coherently from one chapter to another chapter, because students do not really cooperate, but both worked. Should change the education process begin with academic rules changes first? Some changes in the learning process can be summarized as follows:

- In terms of knowledge, once knowledge is seen as something that is so, just moved from teacher to student. But now that knowledge is the result of construction or transformation of a person who studied the results.
- First learning is receiving knowledge (passive-receptive), now learn is to find and construct (forming) actively and specific knowledge how.
- First teaching is to run an instruction that has been designed, but is now implementing various strategies that help students to learn.

Various methods have been discovered by many educational researchers. Just choose whichever is suitable and relevant to be applied to subjects who amnestied in accordance with the competencies that will be given through the course. In one course can be applied to the development of soft skills more than 2 attributes at once. For example, trained to think analytically, creatively, think critically and time management can be done SCL approach by using problem-based learning or case study. The point of learning SCL:

1. Giving priority to the achievement of student competencies (cognitive ability, psychomotor, and affective as a whole),
2. Giving students' learning experience. (Not just give the exam/test, whereas the learning process can not be known),
3. Students should be able to show the result of learning/performance,
4. Giving the task become a staple in learning,
5. Students present their settlement duties, discussed together, corrected, and corrected, an important process in learning SCL.
6. The assessment process is as important as the results of the assessment (written test more leads on the assessment of learning outcomes, not process).

Several methods can be used in the SCL approach, namely:

a. Small Group Discussion.
b. Role-Play & Simulation.
c. Case Study
d. Discovery Learning (DL)
e. Self-Directed Learning (SDL)
f. Cooperative Learning (CL)
g. Collaborative Learning (CBL)
h. Contextual Instruction (CI)
i. Project Based Learning (PBL)
j. Problem Based Learning and Inquiry (PBL).

When determining the method of learning, the key is to determine what capabilities will be changed from the students after undergoing the learning both in terms of hard skills and soft skills. For example, if the subject is expecting an increase attributes of soft skills of communication, group cooperation, and to think analytically and critically, the group discussions followed by an oral presentation will be an option to apply. Thus, the learning approach is not necessarily suitable SCL between one subject with other subjects.

2. Modes of Transmission Soft Skills

There are at least three ways of learning transmission of soft skills through:
1) Lecturer role model
2) Message of the Week
3) Hidden Curriculum

Development of soft skills is only effective if the transmission, one of them by making the faculty role model for students. For example, if you will uphold the discipline of students, it is a good example can be demonstrated. If lecturers want students to come on time, then the faculty must first come to class. When students are asked to always maintain the cleanliness of the classroom, the teacher must be able to erase the board after finishing college.

Other ways of transmission can be done by giving a moral message at all times face to face either at the beginning of open lectures or closing the meeting. This method is called Message of the Week (MOW). The message conveyed to the form of words pearls from various sources with meaning in life, or animation from the web site that supports the Internet. Can also be "sharing" of the students themselves? If only one semester there are 14 meetings and every student take at least six subjects, then at least in one semester they will be inspired by 84 words and stories that build morale.

At the time of transfer of knowledge professors, lecturers usually do it with lecture method, and may be followed by a question and answer. For example when the lecturer delivered an illustrative case in front of students about the theory of organization, knowledge is transferred to the form of organizational structure, functions of each line, duties and authorities of personnel. This case will not be told of the decision making process (Yogijanto, 2006). But if professors want to give the case to develop the "wisdom", then the process is self-acquired learning process, which means that students must actively participate and lecturers act as facilitators and responsibility is on student success. The purpose of this study is to improve the analytical ability, communication skills, develop a personality and way of thinking quality and increasing wisdom.

In the process of learning, learning plans should be changed from planning to design the conventional way which should contain the competencies expected to be possessed by students after participating in learning. In planning should also be included learning methods to reach competence. No less important aspect in planning is the assessment indicators. Often in conventional learning plan, assessment indicators are not included, so that when students sued the assessment, teachers are less able to explain it. This causes the students less satisfied with the service lecturers.

3. How assessment

Assessment can be done in various ways. Cognitive domains can be assessed by written examination, psychomotor domains by assessing current practice, and affective domains can be done by observation. There is an interesting example when he saw the course practicum learning plan. Competence is expressed as the ability/creativity and create clothing, actually what is appropriate competence is achieved when students learn practical?. Is not only the cognitive and psychomotor only be achieved if students are only able to make?, Rather than doing something with the polite and correct. All of these need to ponder together how to do the best for students. Let us answer the questions below with the conscience of each: 1). Attitudes like what we want to follow?, 2). The will like what we want to get up?, And 3). Attitudes like what we want to support?.

CONCLUSION

Basically, the practice of learning systems, in general, already meets the Bloom classification that divides the competencies into cognitive, affective and psychomotor. The integration of soft skills in the curriculum is to improve the internal and interpersonal aspects in a way to adjust the course syllabus lab work toward improving morals / manners, and the adding of courses with the attributes of soft skills lab. To improves the results, improving the curriculum needs to be supported also by the facilities and infrastructure improvements in learning.

In its implementation has been programmed for implementing soft skills Lecturer in teaching and learning as a model for students. It is expected that with the integration of soft skills will be able to deliver students to achieve a bright future in the work environment in the future.

In the description discussed that the learning is expected to meet world market demand for industry has not fully directing graduates to have skills in terms of affective skills, among others, (a) cooperation in teams, (b) the ability to develop and maintain inter-personal relationships, (c) identify the needs and ability to make lifelong learning. In order for students to have the soft skills, we need educational programs that educate and develop students' ability of internal aspect and the personal in:

1. Improve self-confidence, always prioritize ethics, and be able to develop the intellectual and emotional balance.
2. Personal communication, communication skills (soft skills communications), and the communication of persuasion, for it is necessary for communication research can be produced works of creative communications.
3. Leadership capacity, to think and act strategically, and the ability to identify and solve problems.
4. Build networks (networking) as well as managing activities (event management). Teaching methods that can be done to achieve the above objective include lectures, discussions, case studies, individual and group assignments, seminars, guest lectures, mini projects and presentations, visits and internships in industry and others. All classes give priority to the process of interaction between fellow students and lecturers in relation intact. It is expected that very necessary communication skills will be honed with the good.

Review based on competency based curriculum indicated that curriculum improvement activities are expected to give output in development:

a) Model learning using interactive multimedia to improve the quality of learning
b) Model-based learning curriculum that is flexible to increase the quality of learning.
c) Improved equipment to support multimedia-based learning technology.
d) Curriculum content that has a high adapts vitas with business and industrial world.
e) Improving the quality of teaching materials and library books which can be used by lecturers and students.
f) Improving the quality of research on curriculum-based learning adaptive to the market.
g) Improved infrastructure facilities and laboratories and practical work/internship programm.

To achieve optimal success in developing lab-based education and the concept of link and match, the quality of the input must be maintained and enhanced. For the integration of soft skills in the lab learning framework is proposed to improve internal and inter-personal aspect by making adjustments to the course syllabus lab work toward improving morals/ manners as well as the addition of psychology course communication, leadership and organization, entrepreneurship.

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The Building of Rumah Baca Terapung (RUBAPUNG) Nelayan Muaragembong Community at Bekasi : An Idea

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Abstract

This paper is an idea to implement a form scientific responshibility and educational technology professions that supports the growth and development community needs to expand and equal opportunity to learn, improve the quality of education, improving the education system, increasing community participation and improving the implementation of the interaction between education and development which the community be the center attention to education . By making the subject of Nelayan Muaragembong communities at Bekasi district in answering the needs of her son enhancing learning achievements and improvement of creativity in meeting the needs of life. By looking at geographical conditions, patterns of subsistence, in tradition and values the lives of Nelayan Muaragembong communities then read floating the idea of building a Rumah Baca Terapung (RUBAPUNG) with an integrated concept of central learning and development of local knowledge-based creativity is expected to change patterns of learning and patterns of life that is more effective, and efficient. It is certain that the Rumah Baca Terapung (RUBAPUNG) will be the perfect solution for the limited means of reading, writing and development of creativity, especially for children of fishermen along the river Muara Bendera and generally schoolchildren in the region sub Muaragembong Bekasi district.

Keywords: *Rumah baca Terapung, Fishermen Society, the profession of Technology Education,*

Intruduction

Education anywhere and in any condition is essential. Especially for elementary school aged children up to secondary level. The success of primary education is often measured by the ability to read, write and count. From the reading, writing and arithmetic is expected to grow further creativity. Creativity is authorized self-development potential both in aspects of cognitive, affective and psychomotor even further the multiple intelligences. Therefore, educational facilities must meet standards for achieving the goals more easily realized.

Fulfillment means of supporting education, especially a means to foster and stimulate interest in reading for children krativitas primary and secondary level do not have to be provided in schools but can be approximated with the school environment where the child resides or is domiciled. The ingredients that can help children love reading and enhance creativity is a library or home reading. Home reading or libraries that are built near residential environment will certainly facilitate the children in the use of them.

During these many libraries, parks or home reading ("Rumah Baca") was established outside the school environment. But the "rumah baca" was only used as a place to read it so often these rumah baca do not last long. Based on the results of comparative studies on several rumah baca, the concept

of rumah baca is designed in an integrated reading of the reading, writing and games creativity is a necessity that can make the children happy and full of enthusiasm.

Rumah Baca will be built at the location of Nelayan Muaragembong Bekasi Regency. Housing conditions and means of social interaction they are located along the edge of the river Muara Bendera a length approximately 10 miles to the beach Muaragembong. Therefore, read the home will be built above the river and pond water surface is called with an Rumah Baca Terapung (RUBAPUNG).

It is certain that the Rumah Baca Terapung (RUBAPUNG) will be the perfect solution for the limited means of reading, writing and development of creativity, especially for children of fishermen along the river Muara Bendera and generally schoolchildren in the region sub Muaragembong Bekasi district.

General Conditions and Problems

Muaragembong is one name in the government district at Kabupaten Bekasi of West Java province. This sub-district (kecamatan) is the most extensive sub-region ie 14. 009 ha or 9.6% of the area of Kabupaten Bekasi. Based on the regional Regulation No. 5 tahun 2003, the district Muaragembong included in the region I, which is the development of a special development Pantura (Pantai Utara). Characteristic of this region is the new city called “Kota Baru Pantai Makmur” area of 25,028 ha, which includes the District Babelan, Tarumajaya and Muaragembong whose allocation included the development of Settlement, Trade and Services, Port (Warehousing / Container terminal), Industry and Tourism.

Muaragembong which are very far from the hustle and bustle of the city of Bekasi own land surrounded by a vast sea of Java and squeezed between North Jakarta and kabupaten Karawang. No less than three hours needed to travel from the city Jakarta. Most of the population Muaragembong livelihood as fishermen, catching fish, crabs and shrimp to be sold to Jakarta especially to areas Cilincing, Ancol, and Muara Angke. Sub consists of six villages(desa), covering an area of 220 hectares (Ha) Desa Jayasakti , Pantai Mekar 235 Ha, 65 Ha Pantai Sederhana, Pantai Bahagia 265 Ha, Pantai Bakti 2.90 Ha, and Pantai Harapan Jaya with the largest land 275 Ha. Seafront residential area with 14,009 hectares of total land area is dominated by land waters. Fish ponds covering an area of 10,125 Ha to the main livelihood 60 percent of the total population density of 33,093 inhabitants. The rest work with the farmers land, manage land area of 60 ha of dry farming. Critical lands in Muaragembong been treated with agricultural cultivation area of 512 Ha.

The population of Sub Muaragembong under school age are the population aged 7-12 years or equivalent Primary Schools / Madrasah Ibtidaiyah M/F (male/female) amounted to 7.310 souls, of people aged 13-15 years or SMP/MTs M/F amounted to 2.202 souls, and people aged 16 - 18 years or SLTA (high school level) M/F amounted to 1.518 souls of the total population of 33,093 inhabitants. With the occupation of 3.87% percentage growth compared with other districts in Kabupaten Bekasi.

The condition of educational facilities at all levels of schools in Muaragembong can be seen from the table below:

No	Shcools	student	Teacher	Library	Lab.
1	SDN Pantai Bahagia 01	422	10	×	×
2	SDN Pantai Bahagia 02	250	7	×	×

3	SDN Pantai Bahagia 03	123	5	×	×
4	SDN Pantai Bahagia 04	309	5	×	×
5	SDN Pantai Bakti 01	258	7	×	×
6	SDN Pantai Bakti 02	85	4	×	×
7	SDN Pantai Bakti 03	280	5	×	×
8	SDN Pantai Harapanjaya 01	278	7	×	×
9	SDN Pantai Harapanjaya 02	180	7	×	×
10	SDN Pantai Harapanjaya 03	302	7	×	×
11	SDN Pantai Harapanjaya 04	149	5	×	×
12	SDN Jayasakti 01	183	7	×	×
13	SDN Jayasakti 02	300	7	×	×
14	SDN Jayasakti 03	130	7	×	×
15	SDN Jayasakti 04	124	5	×	×
16	SDN Jayasakti 05	161	7	×	×
17	SDN Jayasakti 06	238	6	×	×
18	SDN Pantai Mekar 01	227	8	×	×
19	SDN Pantai Mekar 02	375	6	×	×
20	SDN Pantai Mekar 03	262	9	×	×
21	SDN Pantai Sederhana	144	7	×	×
22	MI Al Falah	70	3	×	×
23	MI Al Khoiriyah	164	5	×	×
24	MI Hidayatul Khoiriyah	0	1	×	×
25	MI Masyaul Huda	38	3	×	×
26	MI Nurul Hidayah	71	3	×	×
27	MI Nurul Huda (Jayasakti)	131	3	×	×
28	MI Nurul Huda (Pantai Bahagia)	70	3	×	×
29	MI Nurul Ihsan	48	2	×	×
30	MI Nurul Iman	134	3	×	×
31	MI Nurul Jannah	137	3	×	×
32	MI Nurul Qomar	64	2	×	×
33	SMPN 1 Muaragembong	51	2	√	√
34	MTs Al Mujahidin	0	-	-	-

35	MTs Assa'adatul Abadiyah	67	3	√	√
36	MTs Nurul Ihsan	200	5	√	√
37	SMA Iman Muaragembong	120	5	√	√
38	SMAN 1 Muaragembong	356	8	√	√
39	MA Assa'adatul Abadiyah	45	4	√	√

Data from UPTD Disdik Kec. Muaragembong 2009

When viewed from the condition of school facilities, especially the existence of libraries and laboratories at the elementary level, it can be understood that the level of skills in reading, writing and numeracy and the development of creativity of students is very low. Coupled with the lack of support facilities for education outside the school. For high school junior and senior high schools of library and laboratory facilities if there is existence to still below the minimum standard. Or in other words "just there".

Given the condition of educational facilities is the development of educational facilities that can address the needs of increasing student kreatiitas ketarampilan and both primary and secondary level becomes very important existence. Moreover, coupled with the conditions of Sub Muaragembong based on data from Badan Pusat Statistics Kabupaten Bekasi is a district that has a minimal number in the acquisition of the Human Development Index (HDI) and Index of Quality of Life together with seven other districts from 23 districts in Kabupaten Bekasi. Because of that district Muaragembong be one central point in the HDI acceleration program in kabupaten Bekasi in addition to seven other districts. Three principal dimensions of development that became the main orientation HDI acceleration is (1) life expectancy at birth (2) letters literacy rate and an average length of school, and (3) the level of purchasing power. While IMH which is a composite indicator consisting of components Infant Mortality Rate (IMR), Life Expectancy 1 Year and letters Literacy rate.

One answer is important in improving the HDI and Index of Quality of Life together is the development of education. If referring to Law no. 20 of 2003 on National Education System, then the measure of its success include: 1). Equitable Education 2). Efficiency of Education 3). Quality Education 4). Level of Education Relevance and 5) participation of public and business / industry in education.

Program development in the subdistrict of special Muaragembong field of human resource development, especially the education sector also needs special attention in order to provide enlightenment of life for their peoples. Therefore, some action needs to be done in this effort are:

1. Mapping of Education (Education Mapping) every level of education, educational facilities, school distribution, and mapping needs of the school education budget.
2. Establishment of model of integrated schools at every level and type of education.
3. Establishment of Community Learning Improvement Model: Literature Society, Functional Literacy Group (NOA), Business Development, Community Health Preparedness, Community Development Information tailored to the characteristics of the region and its people.
4. Empowerment Institute of Formal and Non-Formal Education and Religious Institutions (majelis ta'lim) as learning centers and equitable education services program.
5. Improving education services outside the school and Early Childhood Education program (ECD)
6. Improving Energy Competence Education.

In this regard, one of the formulations that may be filed in overcoming the problems of education in the district Muaragembong is the building to -oriented education means improving the quality of reading, writing and arithmetic (membaca, menulis dan berhitung; Calistung) and enhancing students' creativity. Development of an integrated model between the need to recognize the social environment with the needs of students' learning achievement. Therefore this program closer to a means of learning with students' social interaction with the communities in which they reside. This building of Rumah Baca Terapung (RUBAPUNG).

Expected goals

By understanding the demographics and the existence of educational facilities in district areas Muaragembong, the procurement Rumah Baca Terapung (RUBAPUNG) aims:

1. Accommodate the basic needs of human resource development especially at the elementary and secondary level (students) be means of learning that accelerates the growth of the reading, writing, numeracy and creativity.
2. Fostering the spirit of learning among students and endless residential community Muaragembong fishermen to improve quality of life towards a better and advanced.
3. The growing awareness of the collective settlement of fishermen communities to educate his daughter's son in a higher education level.

Strategies undertaken and the resulting

To merealissikan Program improve reading skills, writing and numeracy and to improve the creativity of children through the construction of Rumah Baca Terapung (RUBAPUNG) can be implemented with the following strategies:

1. Identify the problems associated with low skills in reading, writing and arithmetic, and creativity of children of school age in the district Muaragembong. Further discussion with government officials(Kecamatan) and Desa level by involving the teachers and community leaders.
   This participatory approach is recommended the need for a means of learning outside the school environment which is closer to the house where children live. Facilities that can be libraries or public libraries.
2. Review at several locations that are considered easily accessible to school children and easy shuttle activities of their parents who use motorcycles and boats. The result of the review sites by involving district officials (kecamatan) and some teachers, recommended the construction site Rumah Bacar Terapung in the Desa Pantai Bahagia adjacent to the building SDN 02 (primary schools). This location can be reached with the use of motor vehicles and boats.
3. Socialization with government officials at the district level, Village and the Regional Technical Implementation Unit (Unit Pelaksana Teknis Daerah-UPTD) district education office, school principals and teachers of primary and secondary level, society leaders and youth leaders.
   This strategy is done in the hope of growing a massive awareness on the entire community of the importance of means of supporting the success of the education environment of the community and further grow the responsibility to protect, exploit and develop it.
4. Gaining support from local government budgets of West Java province in order to get further physical development and operating budgets of local government of Bekasi district in order to cover operational costs.

5. Cooperation with institutes of higher learning to obtain institutional development support for the operationalization of the Rumah Baca Terapung) can improve their services.
6. Establishing networks with various parties such as education-oriented NGOs, organissi profession, entrepreneurs and local enterprises and private companies Agara moral and financial support to the development of quality services rumah baca terapung.

Involved parties (stakeholders) and forms of involvement

Participation several parties (stakeholders) in the implementation of Rumah Baca Terapung program can be described as follows:

1. Education and Research Institute of Religious Studies (Lembaga Penelitian Pendidikan dan kajian Agama - LP-dika), Faculty of Islamic Religion, Islamic University "45" Bekasi. The institute is a project proponent and will oversee the project implementation process. In a certain period of time LP-dika will become manager of Rumah Baca Terapung involving daily workers from the local community. In the implementation of development programs, the LP-dika can hold other institutions that have the same vision and mission.
2. West Java Provincial Government through the department of education to facilitate and supervise the implementation of development programs and development programs Rumah Baca Terapung to the next period.
3. Bekasi District Government is expected in a planned and coordinated to be a facilitator, motivator and carry out oversight of program development so that activities can be monitored Rumah Baca Terapung regularly and to determine the policies suggested in the next development project.
4. Government sub-Muaragembong act as an extension of government monitoring of Kabupaten Bekasi in monitoring and responsible in proportion to the use, safety and comfort of the user community Rumah Baca Terapung.
5. Government Village “Desa Pantai Bahagia” particularly where the location of a Rumah Baca Terapung in the wake of reading in addition to being a facilitator and dinamisator against society, is also expected to provide security support for the development process and environment preservation floating around the house reading.
6. Educational institutions (schools) both primary and secondary level, teacher / teacher organization (Persatuan Guru Republik Indonesia-PGRI / Persatuan Guru Madrasah Ibtidaiyah - PGMI) and youth and community leaders serve as a motivator and mentoring on the students in the use of learning facilities that are atRumah Baca Terapung.

Resources that have been owned

Resources (resources) held in order to realize program Rumah Baca Terapung can be identified as follows:

1. The availability of vast land and cheap. Rumah Baca Terapung will be built above ground area of 10,000 M2. In the early stages of physical development will be built covering an area of 600 M2. While the rest will be used for play and learning garden fisheries / aquaculture, animal husbandry and agriculture
2. Human Resources experience in the LP-dika Faculty of Islamic Religion UNISMA Bekasi as managers and planners develop a work program Rumah Baca Terapung. LP-dika can empower

college alumni (graduates) who is domiciled in the district Muaragembong and the teachers to become part of a successful management program Rumah Baca Terrapung.

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